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Mathematical modeling applied to lehigh river water quality, Final Technical Report, National Science Foundation, Student-Originated Studies Program, 10 June - 30 August 1974

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LEHIGH UNIVERSITY

OFFICE

OF

RESEARCH

MATHEMATICAL MODELING APPLIED

TO

LEHIGH RIVER WATER QUALITY

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Mathematical Modeling Applied to Lehigh River Water Quality

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Final Technical Report

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PREFACE AND ACKNOWLEDGEMENTS

This report presents the results of a study entitled: "Mathematical Modeling Applied to Lehigh River Water Quality". This project is part of the National Science Foundation Student-Originated Studies Program. NSF has funded the 12-week summer study from June 10 to August 30, 1974 involving undergraduate and graduate students. The group chose the acronym LERMP: LEhigh River Modeling Project.

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The project was administered by Lehigh University. The following were the student participants:

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8) Joel Caves (part-time; non-stipend)

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The faculty advisor was Dr. Robert L. Johnson, Associate Professor of Civil Engineering at Lehigh University.

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Abstract

Seven students from Lehigh Universtiy and Muhlenberg College have conducted a water quality investigation of the Lehigh River during a 12-week period of the summer of 1974. LERMP (Lehigh River Modeling Project) involved field, laboratory, and quantitative analysis of various water quality parameters for the critical lower 47-mile stretch of the river and the application of a steady state mathematical model utilizing the accumulated data.

During the eight weeks of intensive river sampling, mostly using a rowboat, five runs of the Lehigh River were completed which included 41 river stations, 22 tributaries and 55 effluents. All grab samples were taken in appropriate containers, chilled, and analyzed the same day or the following in the Lehigh University sanitary engineering laboratory. The following water quality parameters were measured; temperature, dissolved oxygen (DO), 5-day biochemical oxygen demand (BOD_5), pH, alkalinity, hardness, total and fecal coliforms, fecal streptococci, chloride, sulfate, nitrite, nitrate, ammonia, Kjeldahl nitrogen, phosphates, calcium, magnesium, potassium, and sodium.

Also the flow for each effluent and tributary along the reach from Jim Thorpe to Easton, Pennsylvania had to be measured, estimated, or calculated. The Ott current meter was used to measure the Lehigh River flow at five stations. The river had an average summer flow of 400 cfs at Jim Thorpe and 1045 cfs at its confluence with the Delaware River.

Several special studies had been previously done on the Lehigh River, which drains 1364 square miles. However the limited amount of water quality data generated were only useful as background information and were not adequate for the summer modeling approach. Besides being input for the desired model, the extensive water quality and quantity analyses serve as a data base for critical summer conditions on the lower Lehigh River.

Because of its completeness, flexibility, computer adaptability, and documentation, the new steady state AUTOSS model from the Environmental Protection Agency, part of the AUTO-QUAL modeling system, was chosen to be applied to the river. The flow and chemical constituents for each effluent and tributary are input into the mathematical model which had been set up on the Lehigh University CDC 6400 computer. Using the "channel-junction method" to represent the river, the AUTOSS model predicts conservative chemical parameters for equal-sized river sections by mass balance techniques. The 47-mile length considered was divided into 100 sections, each of about 0.5 mile. The model uses decay and other interaction variables to model the nonconservative constituents of dissolved oxygen, biochemical oxygen demand, nitrogen forms and bacteria, all of which react through time with the water.

The model mass balance for chemical constituents generally predicts a concentration profile similar to actual measurements. Most increases in flow and chemical constituents occurred between Allentown (RM 16.0) and Glendon (RM 3.0) caused by Allentown sewage, Little Lehigh Creek, Monocacy Creek, Bethlehem Steel Corporation, and Saucon Creek which contains Bethlehem sewage flow.

Dissolved oxygen was the major constituent of concern. Various sources and sinks could be accounted for by the AUTOSS model. Assuming negligible photosynthetic activity and benthal demand, a profile agreeing within 1 mg/ℓ DO was developed. The river has near saturation DO of 9 mg/ℓ from Jim Thorpe to Allentown. Below Allentown an oxygen demand is exerted which causes a sag to 4.5 mg/ℓ before the Glendon Dam (RM 4.0) followed by recovery to about 8 mg/ℓ before the Easton Dam (RM 0.3). Much of the oxygen decrease was accounted for by nitrification of the heavy ammonia loadings from Bethlehem Steel Corporation and Saucon Creek. General literature values were used for the ammonia decay rates. Reaeration rates computed by the Dobbins O'Connor formula were

adjusted upward because of the aeration of the numerous low-head dams. Further studies would be needed to verify the assumed parameters which produced a sag profile within 0.5 mg/ℓ DO.

The predicted bacterial concentration showed the greatest variability from measured values. High total coliform levels of from 1000 to 6000 organisms per 100 mℓ exist over the 47-mile stretch. Bacterial concentrations from wastewater treatment plants on the river and tributaries maintain the high concentrations in the Lehigh River.

Water quality data are one of the major limitations to applying a proper mathematical model to a river. This study focuses the need for further work in the lower Lehigh River below Allentown to better assess the exact interactions which cause the DO sag. Also the sources of bacterial contamination must be isolated and treated to permit safe water recreation on the Lehigh River.

I. INTRODUCTION

The Lehigh River drains 1364 square miles in Eastern Pennsylvania and is the second largest tributary to the Delaware River (See Map in Appendix). The lower 47-mile stretch from Jim Thorpe to Easton has been chosen for a water quality investigation. The river is of good quality in its headwaters but receives various pollutant inputs in the lower half being studied. Municipal wastewater is contributed by Allentown, Bethlehem by way of the Saucon Creek, Catasauqua, Slatington, and Jim Thorpe. The industrial dischargers are Bethlehem Steel Corporation, GAF, New Jersey Zinc, American Nickeloid, Pfizer, Keystone Lamp, Ingersoll-Rand, and Crivellaro Dairy.

The Lehigh River has had a yearly flow of about 2300 cfs at Bethlehem. Flow measurements have been maintained by the U. S. Geological Survey since about 1923 at Walnutport, Bethlehem, and Glendon within the study area. Also the following tributaries are monitored: Pohopoco, Aquashicola, Little Lehigh, and Monocacy. The minimum seven-day consecutive flow to be expected once in ten years is 350 cfs at Bethlehem.

Historically the Lehigh has served as a spawning area for various anadromous fish, but this was frustrated by the construction of low-level wooden dams by coal miners in the 1800's. There are presently seven low-head dams within the study area, changing the water level from about three to 20 feet at each station. In order of size from smallest, these dams are: Palmerton, Hokendauqua, Allentown: Hamilton Street, Northampton, Treichlers, Glendon, and Easton. Not only do these create great pools of river water but they also complicate the water quality interactions since benthic sediments accumulate behind each.

The Lehigh Basin above Palmerton is underlain by thick patterns of sandstones, shales, and conglomerates which produce little dissolved solids in neutral surface waters. From just below the Lehigh Gap (River mile 35.7) to the mouth, the prevalent rock types are slate, limestone, and dolomite. This causes the ground water that infiltrates into the river in this lower region to be alkaline.

The Lehigh River has various beneficial uses including domestic, industrial, and agricultural water supply, fishing, boating and swimming. The water quality criteria and abatement plan established by the Commonwealth of Pennsylvania appears in the Appendix.

Since 1961 the U.S.G.S. has been monitoring water chemistry parameters at two of their gaging stations, Bethlehem and Easton. At Easton an instrument continuously records specific conductance, temperature, and dissolved oxygen. At Bethlehem, the following parameters are monitored monthly: discharge, dissolved silica, calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, chloride, nitrate, orthophosphate, dissolved solids, hardness, noncarbonate hardness, specific conductance, pH, temperature, and color.

In addition to the above data, several special studies have been done on the Lehigh River with limited ammounts of water quality data generated. These include those by Pennsylvania Department of Environmental Resources, Lehigh University, and the Delaware River Basin Commission. (See References). However, the data collected were not adequate to use in a comprehensive mathematical modeling approach.

II. OBJECTIVES AND SCOPE

In the summer of 1974, the NSF Student-Originated Studies project had the general objectives to develop and apply a mathematical water quality model to the Lehigh River. As the particular model was chosen and more familiarity with the available data, physical limitations, and study area were attained, the general objectives evolved into the following specific objectives:

1) Establish a water quality data base for the 47-mile stretch of the Lehigh River from Jim Thorpe to Easton, Pennsylvania.
2) Quantitate all effluents and tributaries of the Lehigh in the designated study area and measure common water quality parameters.
3) Determine the flow for all significant effluents, tributaries, and the river at established sampling stations.
4) Apply the summer 1974 water quality and flow data using the EPA AUTOSS steady state mathematical model.
5) Compare predicted water quality parameters obtained from the model with the measured average summer river results.
6) Define the assumptions and computational approaches needed to complete the computer modeling.
7) Analyze the general water quality condition of the river without detailed characterization of the extent or nature of the complete ecological impact.
8) To critique the utility of the water quality data.
9) Recommend additional research areas for better water quality analysis and prediction on the Lehigh River.

In addition, a general project purpose was to familiarize students with interdisciplinary research involving field sampling, hydrologic analysis, computer programming, laboratory analysis, and mathematical model building. The water quality study permitted the students to apply technical expertise to a significant societal problem.

III. MATHEMATICAL MODELING BACKGROUND

A mathematical model can predict water quality in terms of quantifiable parameters through a deterministic mass-balance relationship. Conservative constituents and non-conservative constituents, which decay with time, can be analyzed using a single system model having a functional relationship between inputs and output. For a river quality study the point-source inputs are the tributary and discharger flows and concentrations along the main stem, and the output is the concentrations of the quality parameters in the river.

Most mathematical water quality models examine the coupled dissolved oxygen system and use the same theoretical basis as the single system. Thus a mass balance is taken about a designated volume of river with all oxygen sources and sinks being computed or input. However, in a coupled system an output, like the nitrogenous oxygen demand for the river, is utilized as an input for the following river section being evaluated.

Water quality models can be made to be very sophisticated to analyze the dynamic behavior of a river. However, for the purposes, effort, and time of this student study a steady-state model was chosen over an advanced scholastic, non-steady, or probabilistic approach. Because of its easy accessability, good documentation, and technical soundness the Environmental Protection Agency AUTOSS model was selected for the project. It is part of the EPA AUTO-QUAL Modeling system and could readily be adapted to the Lehigh University CDC 6400 computer.

Basically the AUTOSS model complimented the assumptions needed to more easily apply an initial mathematical model to the Lehigh River water quality. The water was considered homogeneous throughout each cross-section, i.e. one-dimensional, and non-dispersive. Also first-order rate kinetics were applied by the system to the biochemical reactions being modeled. Similarly the project could and did extend the approach to bacterial reactions. Thus for non-conservative constituents the rate of change of material was directly proportional to its concentration at each moment in time.

A mathematical model is only as good as its input data. Thus extensive water quality sampling done in this project permitted a detailed river analysis in sections of about 0.5 mile. All data entered in the AUTOSS computer model must be referenced to river mile and are linearly interpolated between sections, unless they are computed values. The following data, referenced to

river mile, were needed for a complete water quality modeling: initial river flow; river depth and width along the stretch; water temperature; inflows and flow diversions; inflow concentrations of the particular conservative constituents considered; inflow concentrations of dissolved oxygen (DO); carbonaceous biochemical oxygen demand (CBOD), nitrogenous oxygen demand (NBOD), indicator bacteria considered; CBOD, NBOD, and bacterial decay rates; reaction rate photosynthesis-respiration rate; and oxygen uptake of the sediments.

The AUTOSS model uses the "channel-junction" method to mathematically describe and represent the river on a digital computer. The network established by means of the computer exists under the following assumptions: 1) the natural channel can be accurately represented by a system of discrete volumes, 2) within each junction all water propererties are uniform, i.e. fully mixed, and 3) junction values have point values at the center of a junction.

A complete description of the network, programmed in Fortran, appears in the EPA "AUTO-QUAL MODELING SYSTEM" report. The minor changes made in the model for adaptation to the Lehigh River can be obtained from the Lehigh University sanitary and hydraulic engineering division. The Appendix has a listing of a sample input and output for one run of the mathematical model using the CDC 6400 computer. All output can be plotted by the computer for easy analysis.

IV. LEHIGH RIVER SAMPLING PROGRAM

An effective sampling program was necessary to generate appropriate data on which to calibrate the mathematical model. The most common physical, biological, and chemical parameters to be measured in this baseline study were: river depth, width, velocity and flow, temperature, dissolved oxygen (DO), biochemical oxygen demand (BOD_5), pH, alkalinity, hardness, chloride, phosphates, sulfate, Kjeldahl nitrogen, ammonia, nitrate, nitrite, total and fecal coliforms, and fecal streptococci. The program schedule permitted eight weeks of intensive sampling.

From detailed 15' U.S.G.S. topographic quadrangles possible river sampling stations were located almost every mile. These stations had to be representative, accessible and easily recognizable for repeated sampling throughout the summer.

Because of its size of 600 to 1300 cfs during the summer, the Lehigh River had to be sampled using a rowboat. The exact sampling program evolved from one complete initial run down the 47-mile stretch to acquaint the group with the area and its problems. The group located 19 tributaries and 13 dischargers, including 9 N. J. Zinc pipes and 21 Bethlehem Steel Corporation outfalls, although some had no flow.

The river sampling locations were readjusted in hope of obtaining representative samples above each individual discharger and then sufficiently downstream to allow for adequate mixing of the effluent with the river. Also samples were taken before and after each of the low-head dams to determine the reaeration and benthic demand effects. The U.S.G.S. topographic maps showing all the sampling stations for river mile (RM) 0.0 to 47.0 appear in the Appendix.

Typical sampling proceeded as follows. Three students with the boat and all the equipment drove to the beginning river station for the day, usually at one of the dams. Two used the boat to collect river, effluent, and tributary samples along approximately a 10-mile stretch for a typical day. Also the participants in the boat measured or estimated flow for all outfalls. The other student measured tributary and river flows and collected some samples. A rendezvous point was established for each day's work.

Samples were collected in clean 300 ml DO bottles, 500 ml Nalgene bottles, and sterile 200 ml bottles. At each site the time, temperature and depth were recorded in the field book. Then the bottle numbers for the respective samples were also noted. One DO bottle was fixed with appropriate chemicals to permit Winkler method titration in the lab. The other DO bottle was used to incubate a 5-day BOD test. The Nalgene bottles were for the chemical analyses, and two were generally taken at each site. One sterile bottle was for bacterial analysis. The bottles were immediately placed in an ice cooler on the rowboat for preservation until they could be taken to the Lehigh University sanitary engineering laboratory the same day for analysis.

River samples were generally collected at a depth of 18 inches and at the middle of the cross section. Care was taken to sample upstream from the boat and to exclude any unrepresentative circumstances. Effluent pipes had to be sampled in many ways because of the unique locations and shapes of each. However, all were generally accessible by anchoring the boat and walking along the river bank. Tributaries were sampled in the middle about 100 feet upstream from the confluence with the Lehigh River.

Eight weeks of Lehigh River sampling permitted five runs from Jim Thorpe to Easton. This produced three complete sets of data for the major dischargers. Because the flow did not decrease much during the summer and there were no unusual environmental conditions, the data for the summer was averaged to represent steady state summer water quality.

TABLE 1

LERMP WATER QUALITY SAMPLING STATIONS: 1974

NO.	LEHIGH RIVER LOCATION	RIVER MILE	NO.	LEHIGH RIVER LOCATION	RIVER MILE
1	Jim Thorpe	46.2	22	Above Hamilton Street Dam	16.9
2	Route 209 Bridge	41.8	23	Below Hamilton Street Dam	16.8
3	NE Ext Pa. Turnpike Bridge	40.4	24	Below Kline's Island	16.1
4	Bowmanstown Bridge	39.1	25	Dutch Hill Water Tank	15.1
5	Above Palmerton Dam	37.1	26	Power lines at Ritterville	14.0
5'	Below Palmerton Damn	37.0	27	Old Bethlehem Fabricators	12.8
6	Weider's Crossing Bridge	35.1	28	Surefit	12.1
7	Walnutport Bridge	33.0	29	Above Monocacy Creek	11.5
8	Above Treichlers Dam	28.5	30	Minsi Trail Bridge	10.6
9	Below Treichlers Dam	28.4	31	Above Saucon Creek	9.5
10	Laurys Station	26.1	32	Freemansburg Bridge	9.2
11	Spring Creek	24.7	33	Below Steel City Island	8.4
12	Above Northampton Dam	23.5	34	Lower Saucon Power Lines	7.3
13	Below Northampton Dam	23.4	35	Bethlehem Boating Club	5.7
14	9th Street Bridge	22.3	36	Above Island Park	5.0
15	Above Hokendauqua Dam	21.2	37	Above Glendon Dam	3.2
16	Below Hokendauqua Dam	21.1	38	Below Glendon Dam	3.1
17	Catasauqua Bridge	20.5	39	Glendon Bridge	2.2
18	Race Street Bridge	19.9	40	Train Trestle Bridge	0.9
19	Route 22 Bridge	18.8	41	Above Easton Dam	0.1
20	Tilghman Street Bridge	17.6			
21	Bucky Boyle Park	17.2			

TABLE 2

LEHIGH RIVER TRIBUTARY AND EFFLUENT LOCATIONS

TRIBUTARY/EFFLUENT	RIVER MILE	TRIBUTARY/EFFLUENT	RIVER MILE
Jim Thorpe Sewage Treatment	46.0	Hokendauqua Creek	22.4
Long Run	43.8	Coplay Creek	20.8
Beaver Run	43.7	Catasauqua Sewage	20.2
"La Stinka" Effluent	43.4	Catasauqua Creek	19.8
Mahoning Creek	41.7	GAF	19.4
Pohopoco Creek	40.2	Western Electric	18.0
West Bowmans Creek	39.2	Allentown Wastewater Treatment	16.4
Fireline Creek	38.9	Little Lehigh Creek	16.0
Lizard Creek	38.7	Bethlehem Steel #2	11.6
N. J. Zinc #1	37.4	Bethlehem Steel #3	11.5
N. J. Zinc #2	37.3	Bethlehem Steel #4	11.5
N. J. Zinc #3, 4, 5, 6	37.2	Monocacy Creek	11.4
N. J. Zinc #7	36.9	Bethlehem Steel #5	11.3
N. J. Zinc #8	36.8	Bethlehem Steel #6	11.1
N. J. Zinc #9	36.8	Bethlehem Steel #7	11.0
Aquashicola Creek	35.8	Bethlehem Steel #8	10.9
Pfizer	34.9	Bethlehem Steel #9	10.9
American Nickeloid	33.2	Bethlehem Steel #10	10.8
Slatington Sewage	33.2	Bethlehem Steel #11	10.6
Keystone Lamp Co.	33.2	Bethlehem Steel #12	10.3
Trout Creek	32.9	Bethlehem Steel #13	10.2
Bertsch Creek	30.8	Bethlehem Steel #14	10.2
Rockdale Creek	29.4	Bethlehem Steel #15, 16, 17	10.2
Fell's Creek	26.0	Bethlehem Steel #18, 19	10.1
Un-named Tributary	23.3	Bethlehem Steel #20	9.8
Creek at Railroad Overpass	23.0	Bethlehem Steel #21	9.6
		Saucon Creek	9.4
		Nancy Run	8.6
		Cement Arch Below Island	3.8
		Crivellaro & Sons Dairy	3.6
		Lehigh Valley Chemical Co.	3.4
		Ingersoll-Rand	1.6

V. MEASUREMENT PROCEDURES

A. Physical

To apply a mathematical model to a river system, the hydrologic system parameters must first be known. Depth, width, and cross-sectional area of the river channel through the length studied were generally obtained from Army Corps of Engineers maps. The detailed maps show soundings taken every 10 feet across the river at 200 foot intervals during the summer of 1936 and 1945. Based on measurements at several locations, average depths and widths to compute the cross-sectional area at each mile or half mile were determined (Table 3). This was the only complete data available for the river other than U.S.G.S. topographic quadrangles.

The U.S.G.S. had conducted two incomplete time-of-travel studies on the Lehigh River in October 1970 and August 1973. However these studies were not at the same flow rates as the summer of 1974 and neglected the effect of most of the dams on the river. Thus the velocities from the time-of-travel studies for the various reaches were merely used to check with the velocity measurements made in this study.

All river and tributary flows were determined using an Ott current meter suitable for velocities up to 16.4 feet per second. The intervals between measurements of velocity on a tranquil section of a stream were determined by the width and shape of the stream bed at the location. For shallow depths of less than 6 inches, the number of revolutions of the velocity meter was obtained by placing the meter below the surface at 0.6 of the depth. For greater depths in accessible portions of the river, the student participant waded across the cross section and positioned the meter in measured intervals at 0.2 and 0.8 of the depth. From these readings an average velocity for each cross section could be obtained using the Ott Meter calibration equations:

$$V = 1.512\ (N) + 0.115 \text{ if } N \leq 0.51$$

$$V = 1.647\ (N) + 0.046 \text{ if } N > 0.51$$

where N = the number of revolutions per second

V = velocity in feet per second

Knowing the depths and intervals between measurements, the component cross-sectional areas could be computed. A computer program (see Appendix) was written to compute the total by summing the individual flows calculated by both a linear and quadratic algorithm. Flow is obtained from the identity:

$$\text{Flow (cfs)} = \text{Velocity (fps)} \times \text{Area } (ft^2)$$

A check on the calibration of the Ott meter was performed in a 39-foot open section of laboratory flume. The probe was attached to a variable speed monorail and set at one half the depth. The test results agreed with the manufacturer's within 3% (See Appendix).

No submerged diffuser outfalls were being used on the Lehigh River. The flows for the effluents had to be measured or calculated by various means because little flow data was available from the industries. The municipal waste water plants did have reliable flow data. Wherever possible, small flow rates were determined by timing the filling of a known container volume. Large flow outfalls were computed by the flow methods shown in the Appendix: critical depth or trajectory method. It was attempted to compare these grab flow readings with EPA National Pollution Discharge Elimination System (NPDES) permit values to arrive at average flows for each discharger. The water intake from the river at Northampton Water Co. (RM 24.7) and Bethlehem Steel Corp. (RM 11.6) were obtained from the companies.

The model provides for the consideration of net evaporation - rainfall for the period being modeled. For the steady state summer period of 1974, the measured precipitation (in./month) approximately equaled the average summer evaporation (in./month) for the Lehigh Valley.

All temperatures of the river were measured with a thermometer at a depth of about 18 inches. No temperature routing or modeling was performed for the river, although most dischargers and tributaries were analyzed. Water temperatures were needed to adjust the various rates of decay and reaeration from a standard value at $20^{o}C$ to the observed conditions. Also temperature is used to calculate saturated dissolved oxygen.

Dispersion coefficients (ft^2/sec) are low for rivers; these were not measured or estimated for the Lehigh River.

TABLE 3

LEHIGH RIVER PHYSICAL DATA:

Summer 1974 Averages

River Mile (RM)	Width (ft)	Depth (ft)	River Mile	Width (ft)	Depth (ft)
47	110	3.3	23	300	2.0
	130	4.1			
46	180	1.3	22	320	5.8
	160	1.6			
45	300	1.4	21	200	1.5
	170	2.7			
44	180	2.5	20	130	2.0
	200	2.4			
43	130	3.0	19	320	2.2
	140	2.2			
42	230	2.7	18	290	6.3
	360	2.1			
41	180	1.5	17	480	6.4
	200	4.3			
40	---	---	16	200	6.3
	160	4.4			
39	220	3.3	15	320	4.5
	220	9.5			
38	---	---	14	390	0.9
	200	5.9			
37	260	5.6	13	240	5.5
	240	1.6			
36	320	5.7	12	360	4.5
	320	6.9			
35	---	---	11	270	4.7
34	260	2.4	10	430	1.3
	290	4.0			
33	360	3.0	9	280	8.4
	360	3.5			
32	340	2.2	8	270	7.6
	190	4.3			
31	260	5.0	7	300	4.6
	230	7.3			
30	330	5.9	6	260	8.8
	470	6.0			
29	---	---	5	390	6.8
28	280	5.6	4	500	7.2
			3.1	500	7.2
27	310	7.9	3	150	3.7

TABLE 3 (cont.)

LEHIGH RIVER PHYSICAL DATA:

Summer 1974 Averages

River Mile (RM)	Width (ft)	Depth (ft)	River Mile	Width (ft)	Depth (ft)
26	---	---	2	320	4.4
25	400	1.0	1	290	9.9
24	230	3.1	0.05	310	11.0

SOURCES:
1. River Measurements
2. U.S.G.S. 15' Topographic Quadrangle Maps
3. Army Corps of Engineers Maps: Summer 1936 and 1945

B. Biological

Dissolved oxygen (DO) is a critical constituent for the aquatic life of a river. This common indicator of water quality and general river healthiness was measured extensively along the river and for each effluent and tributary using the azide modification of the Winkler method as described in Standard Method for the Examination of Water and Wastewater (13th Ed., pp. 475-479). Immediately after collection in 300-ml DO bottles, samples were fixed on the river and brought back to the lab in an ice chest or a box for titration.

To model the Lehigh River DO, various overall sources and sinks caused by the effluents or produced in the river had to be assessed. Each of the source/sink terms shown in Table 4 may represent the output of a relatively complex system.

In stabilizing organic matter, bacteria utilize oxygen under aerobic conditions. The important biochemical oxygen demand (BOD) test is a measure of the amount of oxygen required by the bacteria during the degradation. Five-day BOD tests were performed according to Standard Methods (pp 489-494). BOD samples were chilled upon collection and brought back to the laboratory for incubation at 20°C. Most river samples did not need to be diluted; however, some discharges and tributaries had to be reduced in concentration to obtain satisfactory results.

After five days the dissolved oxygen was determined by the azide modification of the Winkler method for samples during the first half of the summer. Later a Portable DO probe from Yellow Springs Instrument Co. was used and, in addition to saving effort, agreed well with the first technique.

The biochemistry participant also ran four long-term BOD tests, two at once for two separate periods during the summer. The jug dilution method of Orford, et al (1953) was used to determine the amount of oxygen consumed by the bacteria in about 25 days. The first pair consisted of one 5-gallon river sample from below Allentown's Kline Island (RM 16.1) and one from below the confluence of Saucon Creek and the Lehigh River. (RM 9.3). The second pair during the following three weeks consisted of two samples from below Kline's Island, one had nitrification inhibitor N-serve added.

The purpose of the long-term BOD tests was to acquire a decay rate for the carbonaceous and/or nitrogenous oxygen demands. The group used the computer to calculate and plot the accumulation of BOD with time.

TABLE 4

DISSOLVED OXYGEN

BALANCE

SOURCES	SINKS
1. Atmospheric Reaeration	1. Carbonaceous BOD (CBOD)
2. Photosynthetic Production	2. Nitrogenous BOD (NBOD)
3. Man-induced Reaeration, e.g. Dams, Aerators	3. Benthal Demand
	4. Biological Respiration
	5. Chemical Oxidation

The procedures to measure the nitrogen compounds and respective nitrogenous oxygen demand are discussed in the following chemical section.

The AUTOSS model utilizes a photosynthesis-respiration rate in its dissolved oxygen balance to represent the net difference between the photosynthetic production of oxygen and its usage by biological activity other than biochemical oxygen demand or sediment uptake. This study attempted to acquire phytoplankton productivity rate values by two methods: evaluation of diurnal DO measurements and light and dark bottle technique. However these methods do not directly estimate algal respiration alone without bacterial respiration.

The sampling of the river was conducted during the daylight hours. To check the fluctuation in the photosynthetic production of oxygen as opposed to the relatively steady oxygen demand of respiratory activity, the project conducted two all-night diurnal oxygen studies. The first on 18 to 19 July 1974 was on the river below Kline's Island; the second on 1 to 2 August was above the Glendon Dam (river mile 3.2). Samples for DO and BOD_5 were taken over a 24-hour period from the middle of the river. Also four sets of light and dark bottles were placed in the river at Jim Thorpe, Allentown, Bethlehem, and Glendon.

Standard Methods was followed to measure the productivity by means of the two oxygen methods (pp. 738-754). The light and dark bottle technique measures merely the plankton productivity, while the diurnal study should show the effect of periphyton productivity also.

The effect of benthal oxygen demand, chemical oxidation, and reaeration could not be assessed in the field for the scale and time of this project. In-situ measurements of oxygen uptake behind the dams would have been desirable; a benthic respirometer is necessary. Most of the river had very little deposits of periphyton and generally it was difficult to use the Ekman dredge to acquire any benthal deposits except below Saucon Creek.

The reaeration coefficient is definitely necessary for any oxygen balance but was not measured for the Lehigh River. The Dobbins O'Connor equation is used in the AUTOSS program to calculate reaeration rates and has been verified for rivers of average depth from 1 to 30 feet and velocities of 0.5 to 1.6 fps. The Lehigh River satisfies these conditions, but the man-made dams complicate the analysis. Thus reaeration rates in the range of 0.1 to 12.0/day had to be assigned to the river sections based on field observations and computed Dobbins O'Connor values from the equation:

$$K_2(@20^oC) = \frac{12.9\ u^{0.5}}{H^{1.5}}$$

where H = hydraulic radius (H)

u = velocity (fps)

K_2 = reaeration rate(1/day)

K_2 is temperature corrected from 20°C by the formula

$$K_2(@T^oC) = (K_2@20^oC)\ 1.024^{(T-20)}$$

The saturation value of dissolved oxygen is a function of temperature, salinity, and barometric pressure. No laboratory studies were conducted to determine DO saturation but rather it was computed in the model by the formula-

$$DO\ sat = 14.62 - 0.367\ T + 0.0045T^2$$

where T is the temperature in °C.

In an attempt to model water quality degradation using standard indicator microorganisms, the biological participant conducted an extensive bacteriological examination of the river and its tributaries and dischargers. The Millpore filter technique, found in Standard Methods, was used to define the concentrations of three groups of bacteria being investigated: total coliforms, fecal coliforms, and fecal streptococci. The three were chosen to determine which, if any, could be modeled for the Lehigh River. Traditionally water quality studies only tested for total coliforms as a means for evaluating the extent of human and livestock contamination. However, fecal coliforms and strep are often analyzed because the source of pollution can be determined from the ratios of these bacterial concentrations.

Initially 200 ml glass bottles containing 0.4 ml of 10% sodium thiosulfate were used for sample collection, but later heat resistant one-liter Nalgene plastic containers were used. Both the glass and plastic bottles were autoclaved daily at 121°C for 15 minutes at 15 psi. Because of several municipal wastewater effluents, the sodium thiosulfate was used to neutralize any residual chlorine, which kills bacteria, that might have been present from them.

The grab samples were stored in an ice chest on the boat until returned to the lab where they were either filtered and incubated immediately or put in a

refrigeration unit at approximately 6°C. Most samples were filtered within 8 hours after collection, and no sample remained unfiltered 24 hours after collection.

Because of the unknown range of bacterial concentrations in the river and tributary samples, the first series of samples required filter volume of 100ml, 10ml, and 1 ml. Presterilized Millipore filters (HAWG 047 50) having a pore size of 0.45 microns were used. The set of volumes had to be filtered three times for each sample to determine the concentrations of total coliforms, fecal coliforms, and fecal strep. Once the approximate number of organisms per 100 ml sample was found, only six volumes, or two for each type of medium, were filtered for each sample.

After filtration, each filter paper was placed in a petri dish containing an absorbent pad saturated with selectively differential media. The plates containing selective media for total coliforms and fecal strep incubated well at $35\pm0.5^{\circ}C$. The fecal coliform plates should be incubated at $44.5\pm0.2^{\circ}C$. However, an incubator with this narrow range of tolerance could not be obtained so the temperature was kept at $45\pm0.5^{\circ}C$. Incubating at the latter high temperature permits fecal coliforms like E. coli to survive but not others like Aerobacter aerogenes, a gram-negative, nonspore-forming, rod-shaped bacteria which ferments lactose with gas production at $35^{\circ}C$ but is not of fecal origin.

After the appropriate incubation period, the colonies were counted using a 10X stereoscope. Using only two volumes of 10 and 100 ml sometimes caused the number of colonies on the filter paper to be beyond the accepted accuracy range: 20 to 100 colonies per filter paper. To get reasonably accurate counts with large numbers of colonies, the plates were incubated for shorter than the recommended time periods to keep the colonies from growing together. As many as 200 colonies per plate were accepted when the total and fecal coliforms were counted after 16-20 hours of incubation instead of the normal 22-24 hours.

C. Chemical

Various mineral, nitrogen, phosphate, and metal constituents have been analyzed for use in modeling the Lehigh River quality and establishing a data base. For this study it is assumed that most of these variables are conserved throughout the time and space scale being investigated. Thus the AUTOSS computer model deals with these by means of a simple mass balance routine, neglecting any decay, losses to the river bottom, and ground water dilution. Total dissolved solids (TDS) are usually considered conservative, but individual components were chosen to be analyzed in this study in an advective fashion to show the general river profile.

Samples from the effluents, tributaries, and river were collected in one liter plastic bottles and brought back to Lehigh's sanitary engineering lab for analysis. Determinations of pH, alkalinity and nitrogen forms were performed immediately or refrigerated and done the following day. The samples were stored by bottle number and further analyzed as time, chemical availability, and equipment permitted.

The procedures for analyzing the chemical constituents were as follows:

1) Ammonia (NH_3) was measured using Nessler's reagent according to Standard Methods. In this and all other colorimetric determinations a Bausch & Lomb spectronic 20 was used.
2) Nitrate (NO_3) was measured using the cadmium reduction (modified diazotization 1-Napthylamine-Sulfanilic Acid) method as in Standard Methods, modified by Hach reagents.
3) Nitrite (NO_2) was measured by the diazotization method (1-Napthylamine-Sulfanilic Acid) as in Standard Methods, modified by Hach reagents.
4) Total Kjeldahl Nitrogen was measured according to Standard Methods with a Nesslerization finish.
5) Sulfates (SO_4) were measured using the turbidimetric method according to Standard Methods, modified by the use of Hach reagents.
6) Chlorides (Cl) were measured by the mercuric nitrate method according to Standard Methods, modified by the use of Hach reagents.
7) Alkalinity was measured using Standard Methods potentiometric titration with 0.02N H_2SO_4.

8) Hardness was measured by an EDTA titration according to Standard Methods, modified by the use of Hach reagents.

9) Phosphates (PO_4) were measured by the ascorbic acid method according to Standard Methods, modified by the use of Hach reagents.

10) Total phosphates were determined by acid hydrolysis with 5.2N H_2SO_4 followed by neutralization and the ascorbic acid determination according to Standard Methods, modified by the use of Hach reagents.

11) pH of all samples were measured with a Fisher Accumet pH meter.

12) Calcium (Ca), magnesium (Mg), sodium (Na), and potassium (K) determinations were run on the Dial-Atom Mark II Atomic Absorption Flame Emission Spectrophotometer JA 82-720. Sodium and potassium were run on flame emission. The others were determined by atomic absorption according to Standard Methods.

VI. DISCUSSIONS OF RESULTS

A. Physical

The flows measured on the Lehigh River for the Jim Thorpe and Glendon stations were consistent through July and August. The averages are 400±30 cfs and 1045 ±20 cfs respectively. (See Table 5). The mass balance for the entire river computed by using the flow at Jim Thorpe and all measured discharges and diversions of at least 1 cfs (Table 7) gave a flow of 1033 cfs at Glendon. This calculated rate agrees well with the average measured flow of 1045 cfs. The stations at Palmerton and Bethlehem, measured only once in August, and the stations at Northampton and Allentown, when averaged at the wide range of flows observed, do not check well in the mass balance. The lack of consistency and repeatability of measurement can account for the flows not agreeing with those calculated by the overall summer mass balance.

Besides errors in the river measurements, the flow mass balance has other possible sources of error: the computed and measured tributary and grab sample effluent flows; non-point source loadings; and ground water interaction. Average values had to be used for all effluents and tributaries, and some did have a large flow range as seen in Table 6. The Ott Meter calibrated in the lab agreed within 3.3% of the velocity expected. Obtaining cross-sectional areas was done approximately by pacing and thus another source of inaccuracy.

The flows for most pipes are approximations; a continuous flow metering device would be needed on all major outfalls. As a check, the flow rates were compared with those used in the National Pollutant Discharge Elimination System (NPDES) permits. The flows and sample calculations for the dischargers appear in the Appendix.

Temperatures for the Lehigh River ranged from 20 to 27°C and tended to increase going downstream. Increases of 3°C were noted for the river passing N. J. Zinc (RM 37.5 to 36.5) and Bethlehem Steel (RM 11.8 to 9.6). Discharges of up to 34°C caused this increase. The river temperature profile appears in Figure 1 and specific values with the data in the Appendix.

TABLE 5

LEHIGH RIVER PHYSICAL MEASUREMENTS

STATION	RIVER MILE	DATE	AVG. DEPTH (ft)	WIDTH (ft)	FLOW (cfs)	AVG. FLOW (cfs)
Jim Thorpe	46.2	7/11	2.4	130	450	
		7/26	2.3	144	374	400
		8/9	2.3	144	377	
Palmerton	35.1	8/14	1.8	254	672	672
Northampton	26.0	7/31	1.5	368	1185	
		7/15	2.3	145	330	703
		8/14	2.6	187	593	
Allentown	16.2	7/10	2.0	335	811	
		7/16	1.9	325	585	797
		8/15	1.4	440	997	
Bethlehem	11.8	8/8	1.4	430	950	950
Glendon	6.5	7/19	2.3	236	1025	
		8/21	2.4	279	1080	1045
		8/15	2.3	223	1030	

TABLE 6

TRIBUTARY FLOWS

Tributary	River Mile	Date Measured	Flow (cfs)	Avg. Flow (cfs)
Beaver Run	43.8	6/24	0.44	
		7/31	1.22	0.81
		7/30	0.79	
		8/9	0.80	
Long Run	43.7	6/24	3.14	
		7/31	3.39	2.55
		7/30	2.15	
		8/12	1.53	
Mahoning	41.8	7/31	17.5	
		7/13	18.2	15.7
		7/26	12.6	
		8/12	14.6	
Pohopoco	40.3	7/31	79.8	
		7/13	65.0	63.0
		7/30	44.5	
		8/12	62.7	
Lizard	40.0	6/24	40.0	
		7/9	25.5	50.5
		7/30	108.4	
		8/12	28.1	
Fireline	38.9	6/26	2.17	
		7/5	2.48	2.52
		7/30	2.92	
Aquashicola	35.0	6/24	63.7	
		7/5	60.3	82.5
		7/30	117.3	
		8/12	88.7	
Trout	32.9	6/26	10.9	
		7/9	11.3	9.12
		7/30	8.23	
		8/14	6.05	
Bertsch	30.8	6/26	5.90	
		7/5	3.19	4.15
		7/30	4.70	
		8/14	2.81	

TABLE 6 (cont.)

TRIBUTARY FLOWS

Tributary	River Mile	Date Measured	Flow (cfs)	Avg. Flow (cfs)
Fells	26.0	6/26	1.21	
		7/5	0.75	1.34
		7/30	1.94	
		8/14	1.46	
Spring Run	24.5	7/5	1.27	0.75
		7/30	0.22	
Hokendauqua	22.4	6/27	19.0	
		7/8	25.3	20.0
		8/1	15.7	
		8/14	19.9	
Coplay	20.6	6/27	13.3	
		7/8	12.2	10.1
		8/1	7.4	
		8/14	7.5	
Catasauqua	19.9	6/28	9.58	
		7/8	6.98	7.88
		8/1	8.18	
		8/15	6.79	
Western Electric	16.5	7/1	4.22	
		7/15	2.22	3.79
		8/1	6.32	
		8/15	2.39	
Little Lehigh	16.1	7/1	138.0	
		7/15	118.6	124.5
		8/7	145.6	
		8/15	85.8	
Monocacy	11.4	7/1	70.9	
		7/15	56.4	57.1
		8/8	48.8	
		8/15	52.2	
Saucon	9.0	7/1	71.6	
		7/16	95.6	92.0
		8/8	101.7	
		8/15	99.1	

TABLE 6 (cont.)

TRIBUTARY FLOWS

Tributary	River Mile	Date Measured	Flow (cfs)	Avg. Flow (cfs)
Nancy Run	8.6	7/2	12.2	
		7/10	8.73	9.03
		8/8	7.09	
		8/15	8.08	

TABLE 7

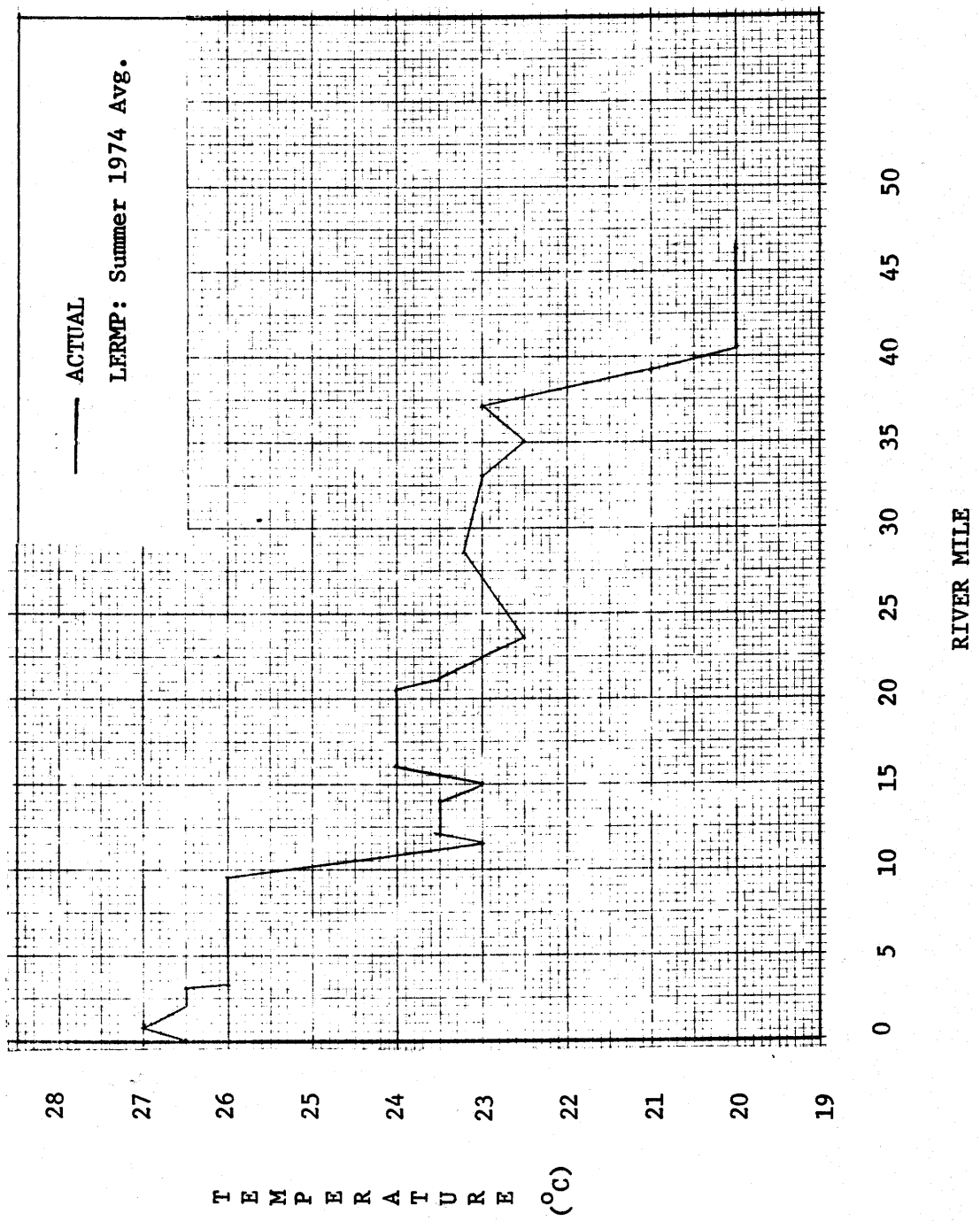
MEASURED FLOW MASS BALANCE

Location	River Mile	Added Flow (cfs) >1	Cumulative Flow Totals (cfs)	Measured River Flows (cfs)
Lehigh River at Jim Thorpe	46.2	400	400	400[2]
+ Jim Thorpe Sewage	46.0	1		
+ Long Run	44.1	3		
+ Beaver Run	44.1	1		
+ Mahoning Creek	42.1	16		
+ Pohopoco	40.5	63		
+ Fireline Creek	39.1	2		
+ Lizard Creek	38.9	31		
+ N. J. Zinc	37.4-36.5	11		
+ Aquashicola	35.9	71		
Lehigh River at Palmerton	35.1	+199	599	672[1]
+ Pfizer	35.0	1		
+ Trout Creek	32.9	9		
+ Bertsch Creek	30.9	4		
Lehigh River at Northampton	26.0	+ 14	613	703[2]
+ Fell's Creek	25.9	1		
+ Hokendauqua Creek	22.7	20		
+ Coplay Creek	20.7	10		
+ Catasauqua Sewage	20.2	3		
+ Catasauqua Creek	19.8	8		
+ Western Electric Tributary	18.0	4		
+ Allentown Sewage	16.4	55		
Lehigh River at Allentown	16.2	+101	714	797[2]
+ Little Lehigh Creek	16.1	125		
Lehigh River at Bethlehem	11.8	+125	839	950[1]
+ Monocacy Creek	11.3	57		
+ Bethlehem Steel	11.8-9.6	242		
- Bethelehm Steel Intake A	10.9	- 69		
- Bethlehem Steel Intake B	10.2	-137		
+ Saucon Creek	9.4	92		
+ Nancy Run	8.5	9		
Lehigh River at Glendon	6.5	+194	1033	1045

1 Measurement in August
2 July - August Average

FIGURE 1

LEHIGH RIVER PROFILE:
TEMPERATURE



B. Biological

The major emphasis of the applied model was the dissolved oxygen balance for the Lehigh River. Each of the major sources and sinks used in the AUTOSS model will first be discussed.

Single system models have been widely used in river water quality studies to describe the biochemical oxygen demand which greatly affects the river's dissolved oxygen. This study has made a distinction between the carbonaceous and nitrogenous oxygen demands. Because of the delay in the growth of the nitrifying bacteria, carbonaceous demand (CBOD) is generally exerted first.

The results of the long-term BOD tests appear in Figures 2 and 3 and are much different than might be expected for a river. The near linear rate of oxygen utilization is at odds with the concept of first order kinetics used in simulating biological oxygen utilization. From chemical tests it was observed that nitrification was also proceeding as well as the carbonaceous oxygen use. The second group of tests performed in August were opposite of what would be expected; the nitrification inhibitor test should show a much lower demand. Figure 2 shows the river having a 20-day demand of about 7 mg/l, which is significantly less than 30 mg/l for the other tests.

Because of the inconsistency of the long-term tests, the results could not be used to determine decay coefficients. Possibly oxygen entered into the sample jugs during the test or diffused from the 5-gallon supply to 1-gallon sample jug used in the test. Further tests need to be performed and are planned by Lehigh University personnel. There may be toxic substances in the river which inhibit immediate oxygen demand exertion.

Therefore ultimate carbonaceous and nitrogeneous biochemical oxygen demand and their respective decay rates had to be determined using various assumptions. A common value for deoxygenation rate with no nitrification occurring (K_c) is 0.23/day. Using this value the ultimate carbonaceous biochemical oxygen demand, CBOD would be 1.45 BOD_5 from the equation:

$$CBOD = \frac{BOD_5}{(1 - e^{-5K_c})}$$

The CBOD profile appears in Figure 4 with predicted and actual agreeing within 1 mg/l except for around Glendon Dam (RM 3.2). Allentown Sewage (RM 16.4)

approximately doubles the river concentration from 3 to 6 mg/l CBOD. Similar results could be achieved using a high ultimate demand and a lower decay rate but these would have to be validated from further long-term BOD river studies.

FIGURE 2

LEHIGH RIVER LONG-TERM BOD TEST NO. 1

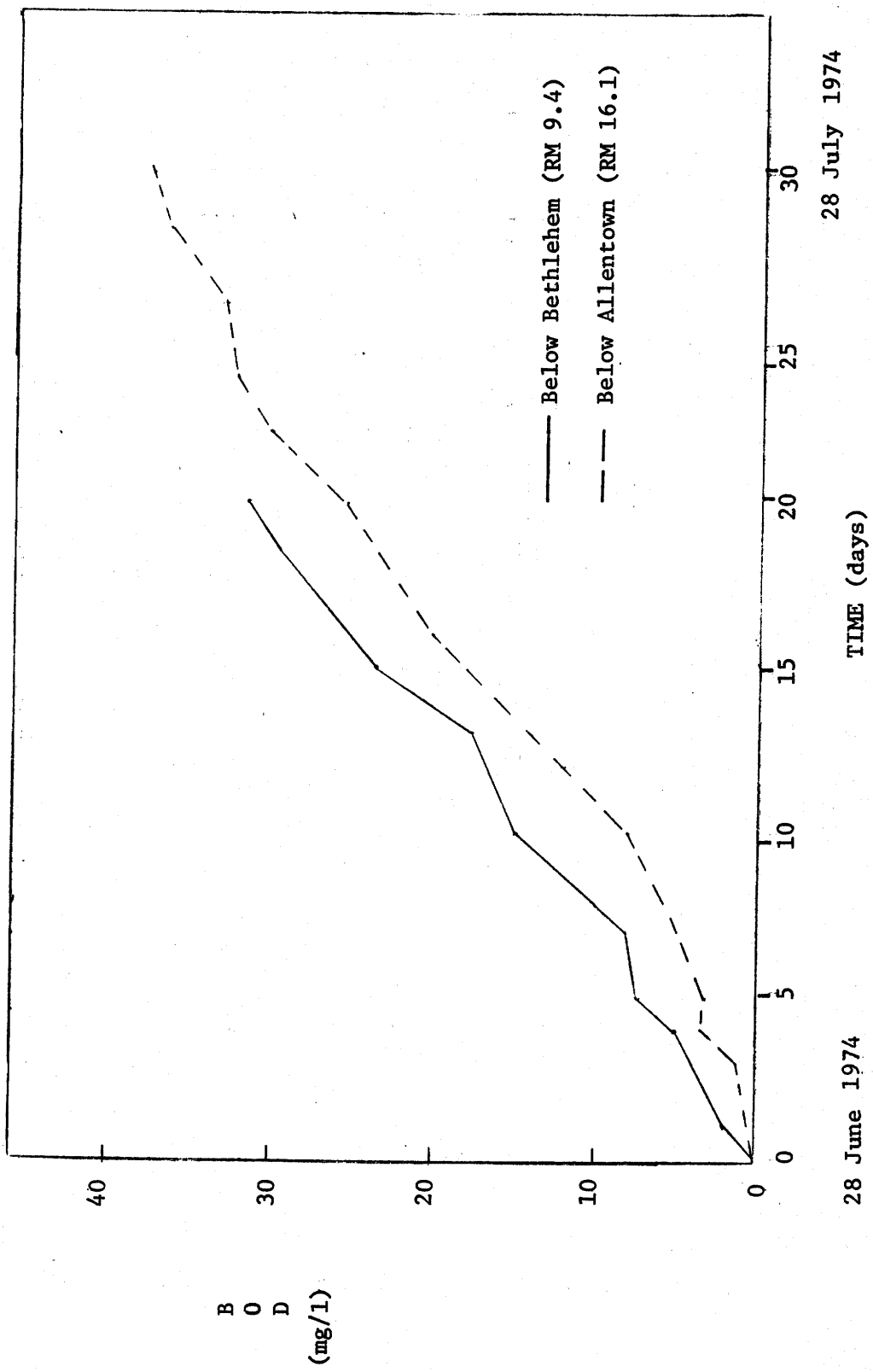


FIGURE 3

LONG-TERM BOD TEST NO. 2
LEHIGH RIVER BELOW ALLENTOWN (RM 16.1)

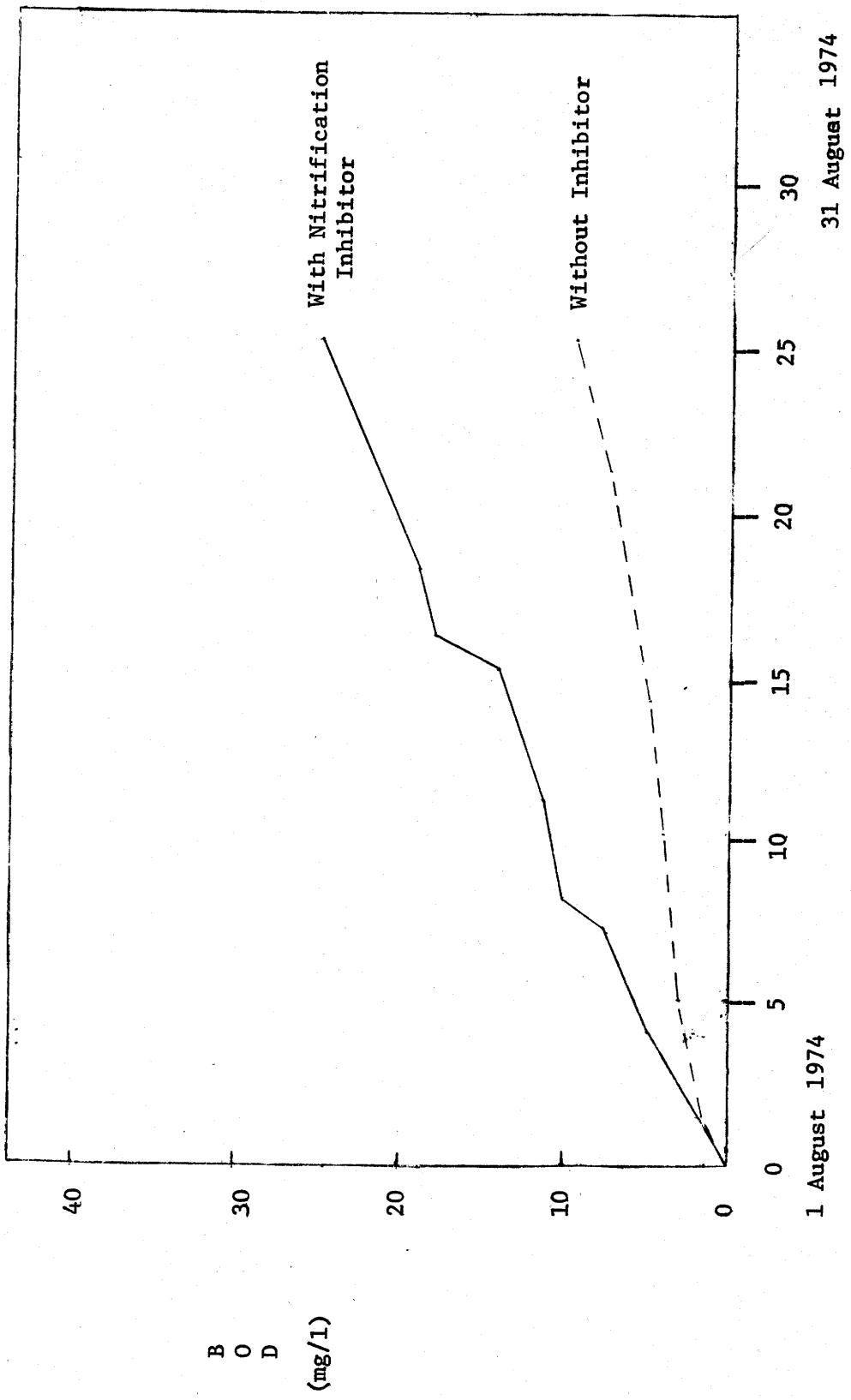
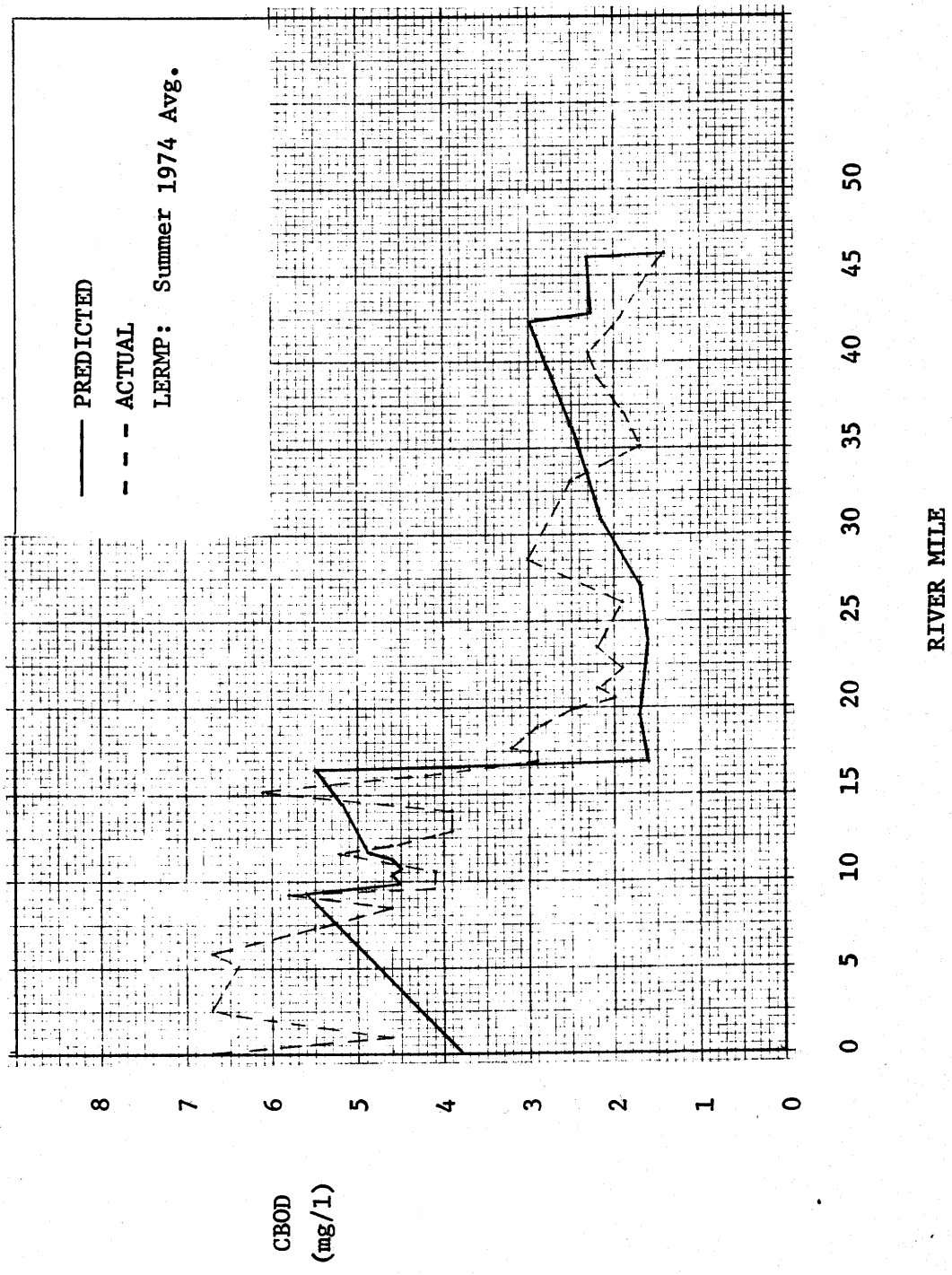


FIGURE 4

LEHIGH RIVER PROFILE:
CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND



Because of their significant effect on dissolved oxygen, especially in the Lower Lehigh River, the nitrogen results are discussed in this section. In most water nitrogen is originally present in the form of organic nitrogen and is gradually oxidized to ammonia, nitrite, and nitrate in what is termed the second stage nitrogenous oxygen demand (NBOD).

Nitrifying bacteria Nitrosomonas oxidize ammonia to nitrite and Nitrobacter oxidize nitrite to nitrate. By stoichiometry the oxygen required for complete oxidation is:

$$NBOD = 4.57\ (TKN) + 1.14\ (NO_2\text{-}N)$$

where TKN is the Total Kjeldahl Nitrogen (Organic-N + Ammonia-N). Thus the discharge of ammonia and subsequent oxidation could seriously decrease the DO levels for the river, especially where long residence times permit the growth of nitrifying bacteria.

The nitrogen values do show significant nitrogen increases in the river and nitrification in the lower 15 miles of the Lehigh River. The plot of Kjeldahl nitrogen was mostly academic because not enough measurements were made. The nitrogen forms cannot be treated as conservative constituents as shown in Figures 5 through 8 using the AUTOSS model. However, a mass balance gives an estimate of the amount being oxidized. The inorganic nitrogen forms can be more accurately simulated by considering first order nitrification reactions, BOD degradation, and algal, bacterial, and zooplankton uptake and excretion. The total nitrogen for the river, however, should obey a mass balance check as shown in Table 8 and in Figure 9.

Saucon Creek, Bethlehem Steel, Allentown Sewage, Little Lehigh, and Monocacy Creek contribute substantial nitrogen, especially ammonia, to raise the river load from 6400 lbs/day at Allentown (RM 16.8) to 36,000 lbs/day at Freemansburg (RM 9.2). From Saucon Creek (RM 9.4) to the Glendon Dam (RM 3.2) the forms of nitrogen undergo the changes as shown in Figure 9, based on average river measurements for the summer study.

It seems that the river has sufficient bacterial populations to effect immediate nitrogen oxidation in the lower 10 mile stretch of the river. A common literature value of nitrification rate (K_n) of 0.1/day is greatly exceeded according to the data for this stretch of the river.

The stoichiometric relationship for nitrification has been used to calculate the NBOD, with ammonia-N being used in the formula instead of TKN. Figure 10 shows the resulting profile using a nitrification rate of 0 above Allentown, 0.1/day for RM 16.0 to 9.0, 0.4/day for RM 9.0 to 3.4, and 0.1/day below RM 3.4. The predicted and actual agree within 1.5 mg/l for most of the river. Saucon Creek significantly increases the measured NBOD from approximately 6 to 16 mg/l.

FIGURE 5

LEHIGH RIVER PROFILE:
AMMONIA

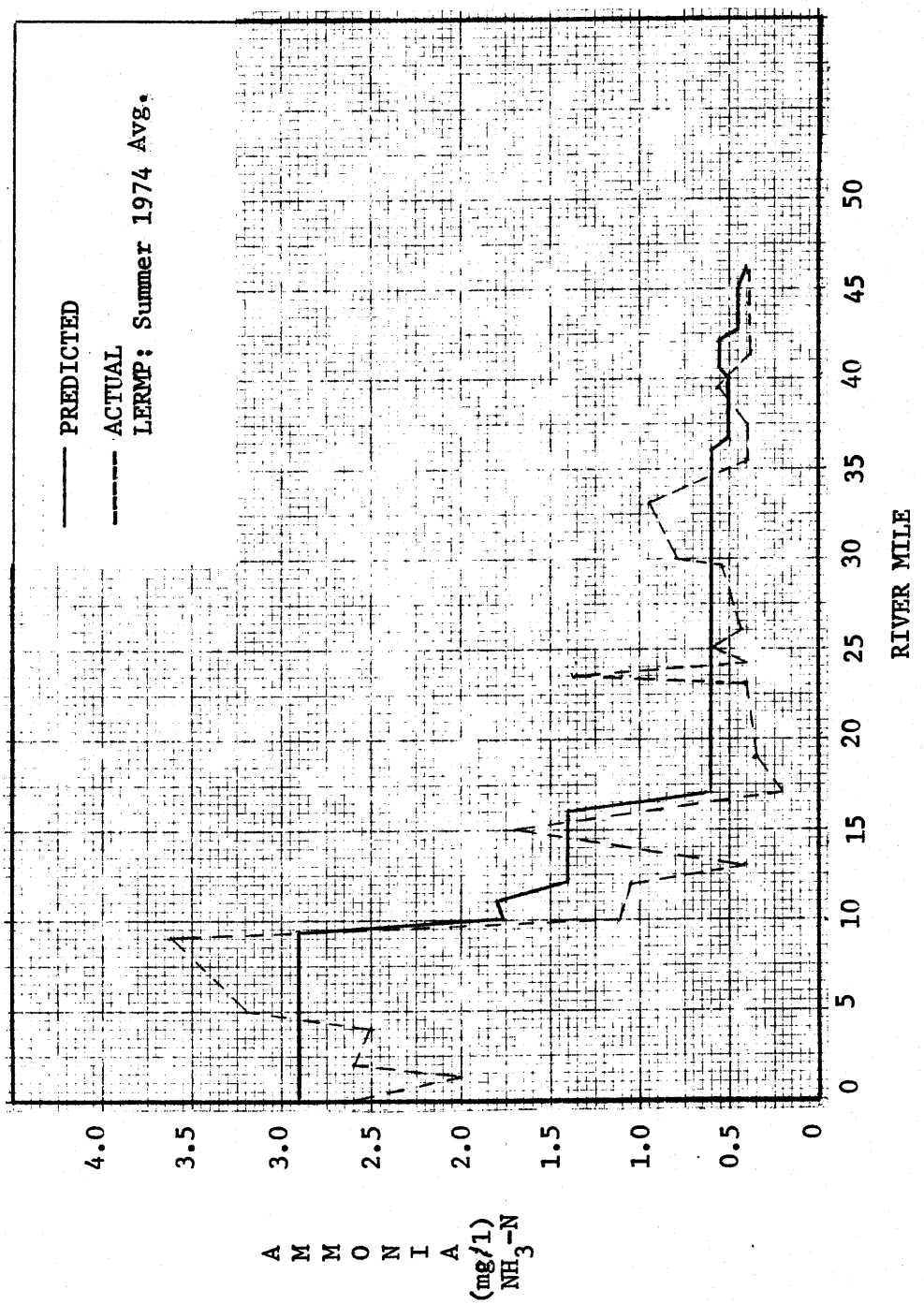


FIGURE 6

LEHIGH RIVER PROFILE:
NITRITE

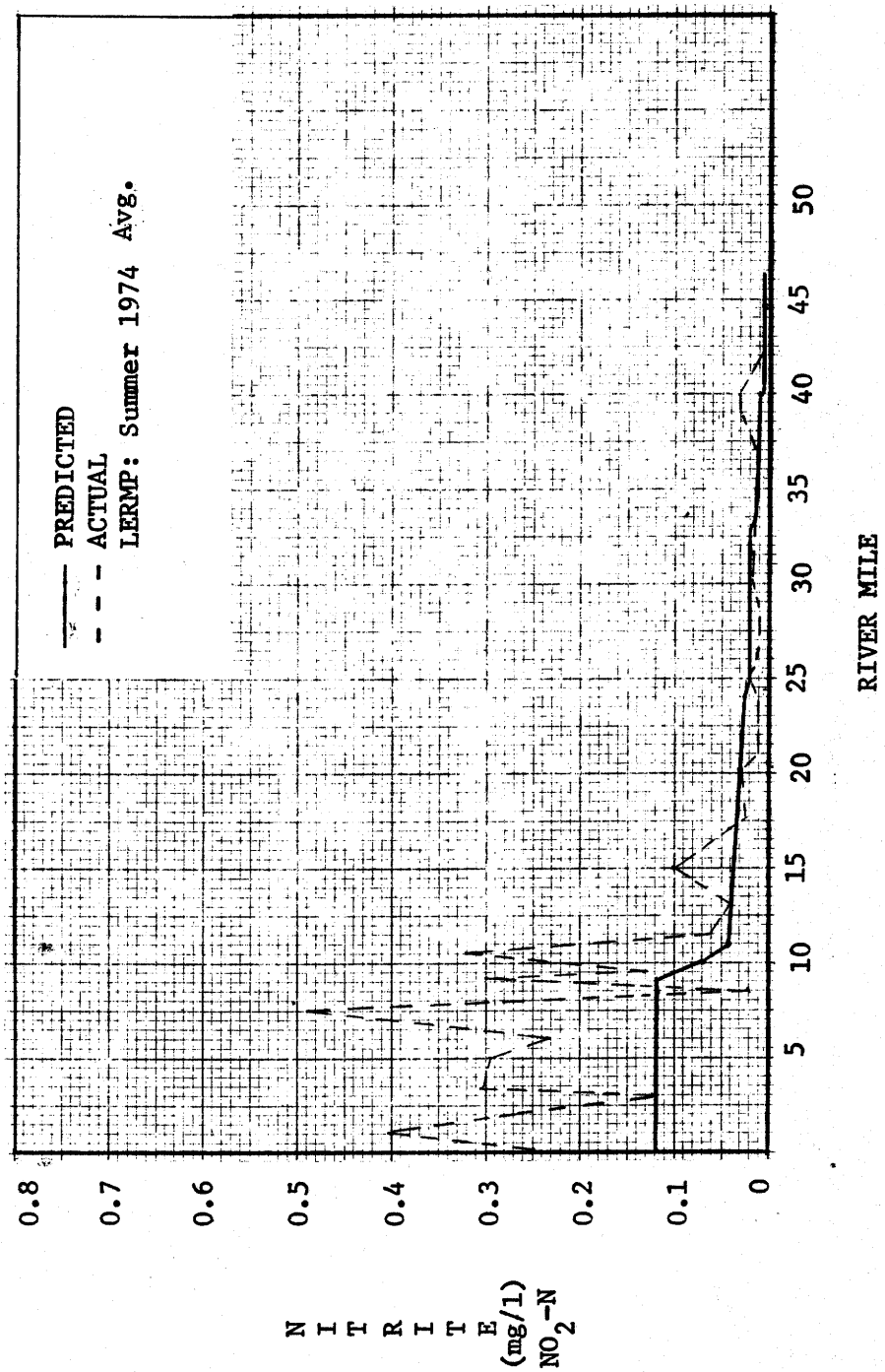


FIGURE 7

LEHIGH RIVER PROFILE:
NITRATE

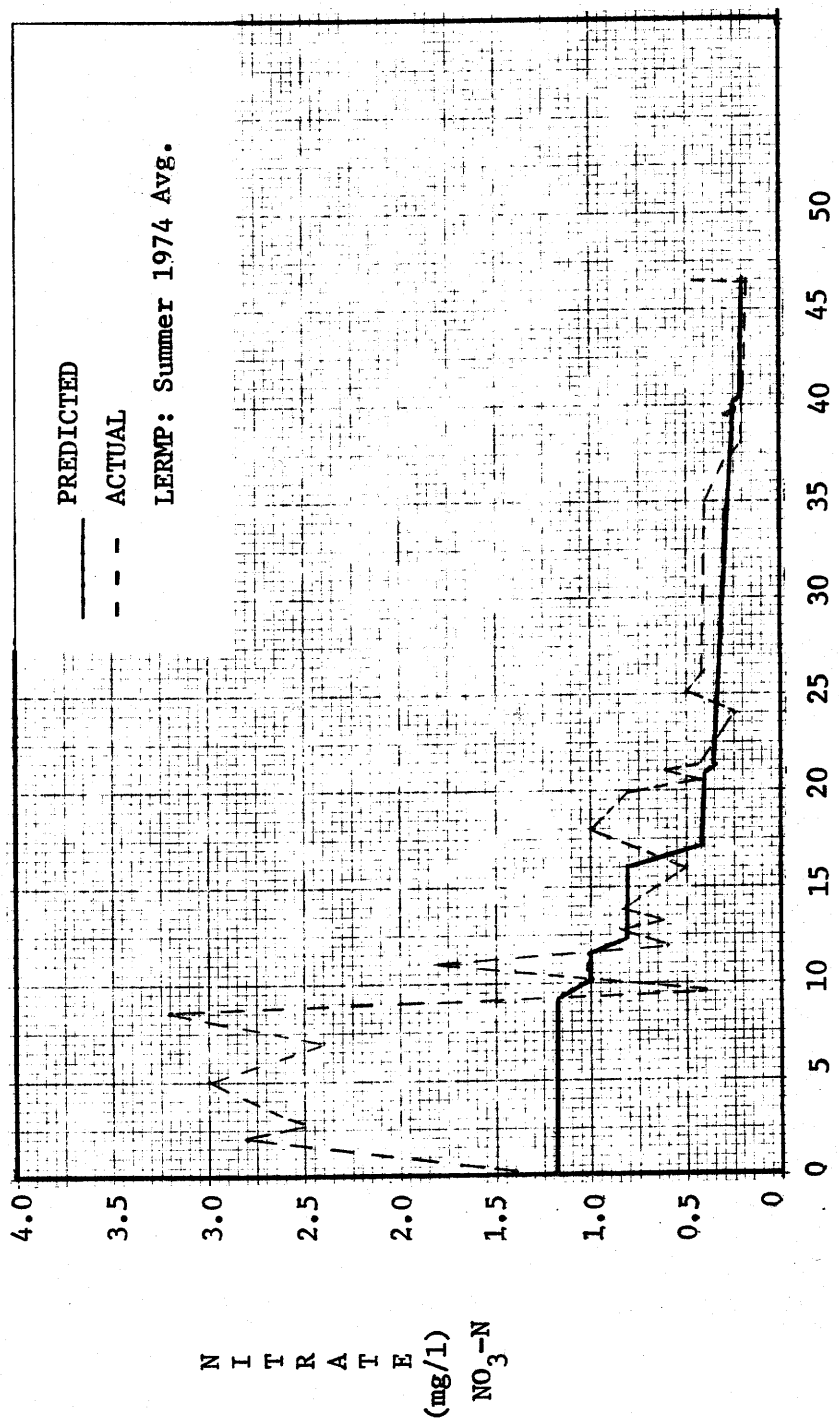


FIGURE 8

LEHIGH RIVER PROFILE:
KJELDAHL NITROGEN

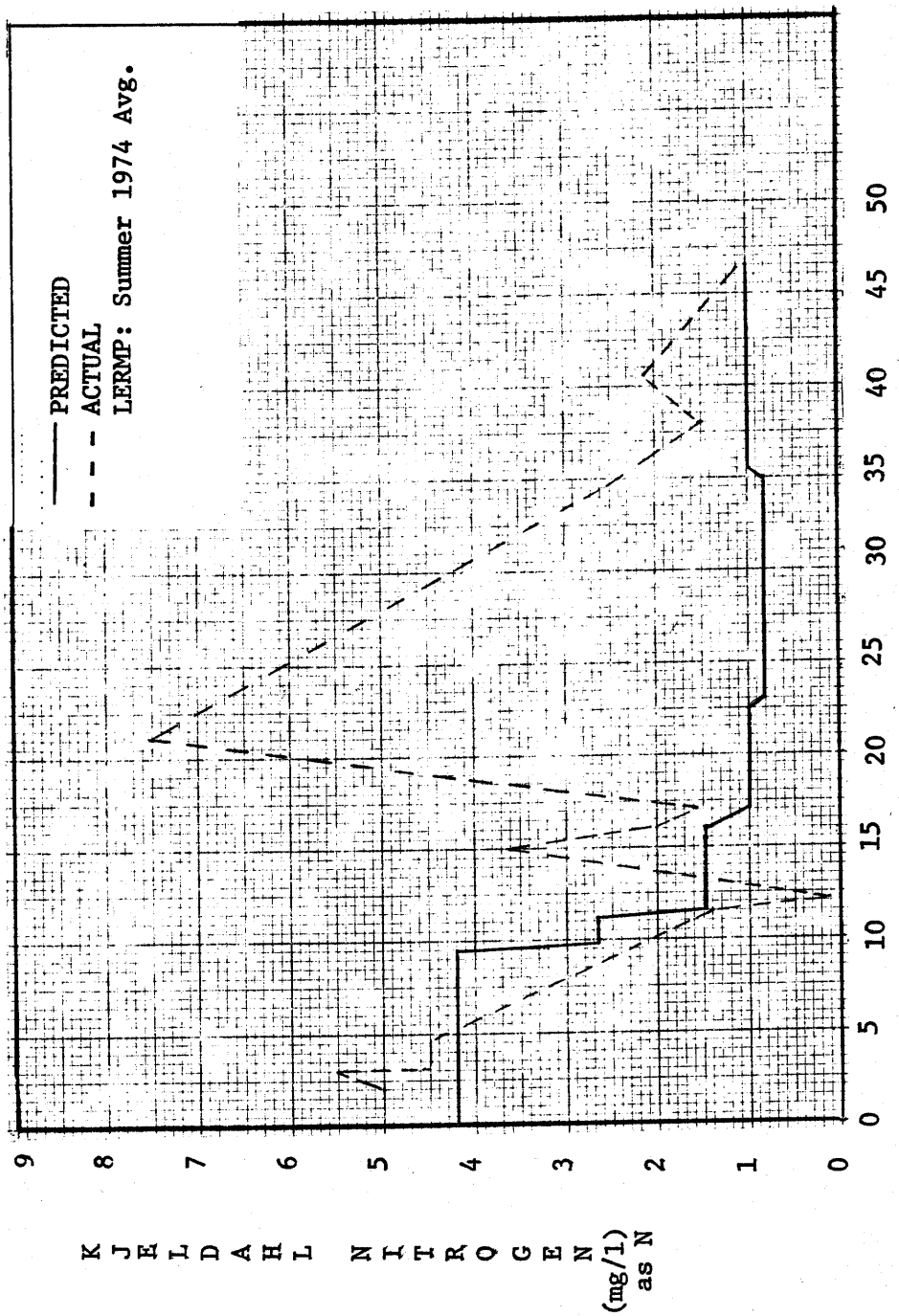


TABLE 8

NITROGEN MASS BALANCE

LOCATION	River Mile	lbs N/day				
		NO_2	NO_3	NH_3	SUM	
River above Palmerton	37.5	28.9	1029	2073	3131	
NJ Zinc #1	37.4	0.03	0.65	0.43	1.10	
8	36.6	0.09	3.03	12.8	16.0	
9	36.5	0.31	6.79	10.1	17.2	
Aquashicola	35.9	11.8	163	457	631	
River below Palmerton	35.0	47.1	1507	1453	3006	
River at Allentown	16.8	132.81	3287.0	3021.4	6441	
Allentown Sewage	16.4	18.9	814	3172	4005	
Little Lehigh	16.1	47.0	1413	864	2324	
River below Allentown	15.1	476	3380	8843	12,699	
River at Bethlehem	11.5	332.8	3210.6	4803.0	8346	
Monocacy Creek	11.3	6.46	779	241	1027	
Beth. Steel #3	11.5	0.87	32.9	34.5	68.2	
7	11.0	6.14	1050	3026	4082	
8	10.9	7.42	158	106	272	
9	10.9	6.84	160	118	285	
10	10.8	14.9	17.5	55.5	87.8	
11	10.6	11.2	100.1	46.7	158	
12	10.3	2.3	13.0	5.4	20.6	
13	10.2	8.1	84.8	71.0	164	
14	10.2	0.3	0.3	1.3	2.0	
15	10.2	0.3	1.6	6.8	8.8	
16	10.2	2.4	8.0	9.3	19.6	
17	10.1	86.7	75.1	394	556	
18	10.1	12.7	24.0	54.4	91.1	
19	10.0	12.1	19.3	29.8	61.2	
20	9.8	9.3	61.6	28.3	99.2	6715
Beth. Steel Intakes	10.6	-206	-2076.5	-1237.9	-3368	
River before Saucon	9.5	707	1876	6048	8631	
Saucon Creek	9.4	261	1642	7428	9332	
River at Freemansburg	9.2	1714	13,108	20,848	35,670	
Nancy Run	8.5	0.6	145.0	38.1	184	

TABLE 8 (cont.)
NITROGEN MASS BALANCE

LOCATION	River Mile	lbs N/day			
		NO_2	NO_3	NH_3	NH_3 $+NO_2$ $+NO_3$
• River below Steel City	8.4	153	18,337	19,808	38,300
• River at Saucon Power Lines	7.3	2720	13,250	14,850	30,800
• River at Boating Club	5.7	1320	14,700	17,800	33,800
Crivellaro Dairy	4.4	0.11	1.0	2.71	3.82
• River above Glendon Dam	3.2	1730	15,100	14,400	31,300
River at Glendon Bridge	2.2	1570	15,700	14,400	31,800
Ingersoll-Rand	1.6	0.1	6.17	2.33	8.60
• River at Easton Train Trestle Bridge	0.9	14,400	8,240	14,200	23,800

FIGURE 9

LOWER LEHIGH RIVER
NITROGEN PROFILE

LERMP: Summer 1974 August

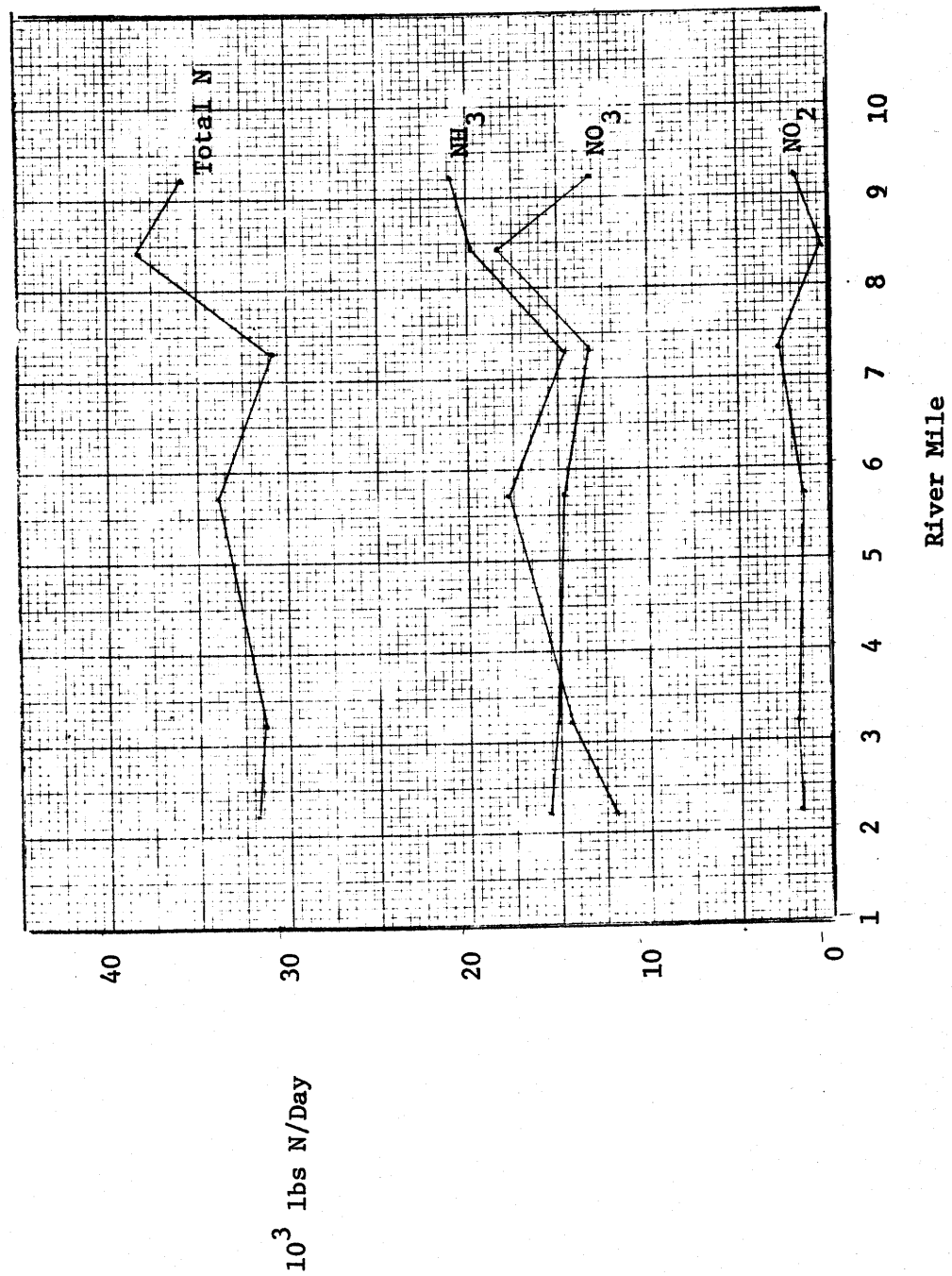
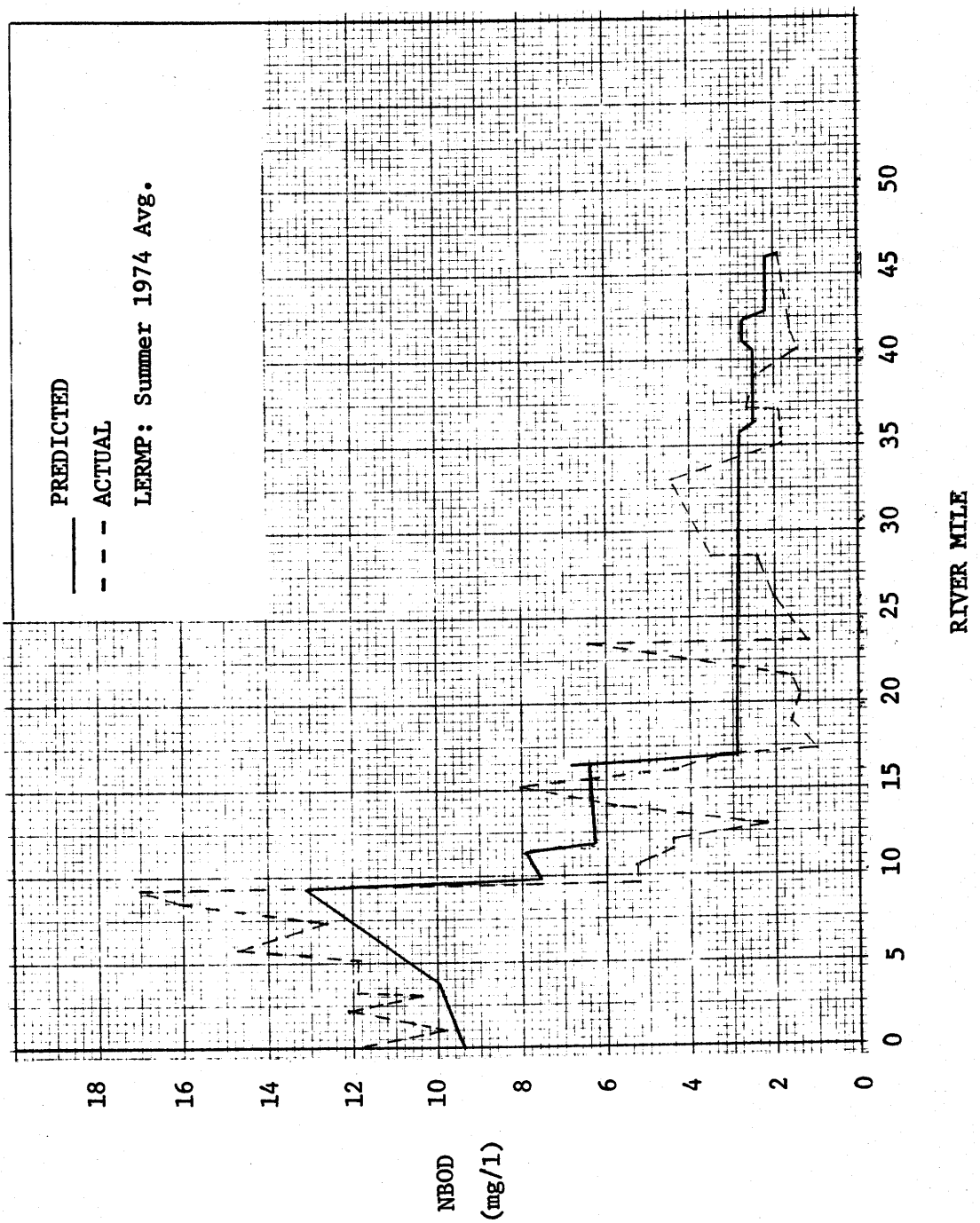


FIGURE 10

LEHIGH RIVER PROFILE:
NITROGENOUS BIOCHEMICAL OXYGEN DEMAND



No quantitative results were obtained for the phytoplankton productivity. The light and dark bottle technique for two of the four tests indicated more DO in the dark bottle than the light; no accurate photosynthesis-respiration (P-R) rate could be assessed. However this technique was inadequate for the river since most of the autotrophs are periphyton, plankton attached to the substrata.

The diurnal oxygen studies, Figures 11 and 12, show a variation of about 1 mg/l DO during the 24-hour period. However the daylight hours did not consistently have a higher DO as would be expected from photosynthesis. Perhaps much of the variation was caused by the sampling techniques by the different people during the study. Qualitatively the two studies indicate that phytoplankton productivity does not have a significant effect on dissolved oxygen in the Lehigh River critical lower stretch.

The 5-day BOD was also measured during the diurnal studies. Figures 13 and 14 show a variability of about 2 mg/l for the BOD_5. The inconsistency of grab samples over time strains the achievable accuracy of any steady state river model.

FIGURE 11

DIURNAL OXYGEN STUDY NO. 1:DO

LOCATION: Lehigh River Below Kline's Island (RM 16.1)

DATE: Thursday 18 July 1974
to Friday 19 July 1974

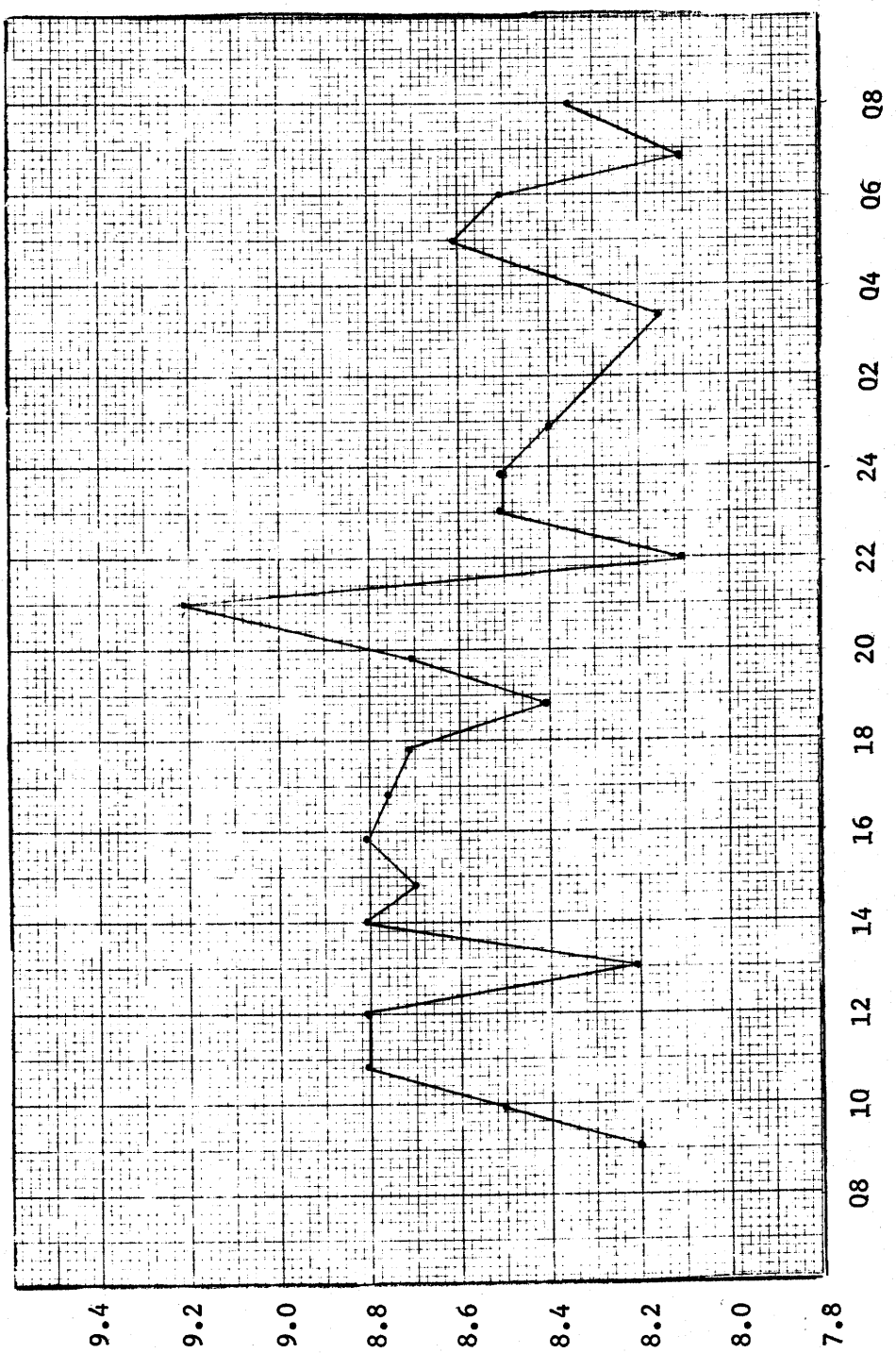


FIGURE 12

DIURNAL OXYGEN STUDY NO. 2:DO

LOCATION: Lehigh River Above Glendon Dam (RM 3.3)

DATE: Thursday 1 August 1974
to Friday 2 August 1974

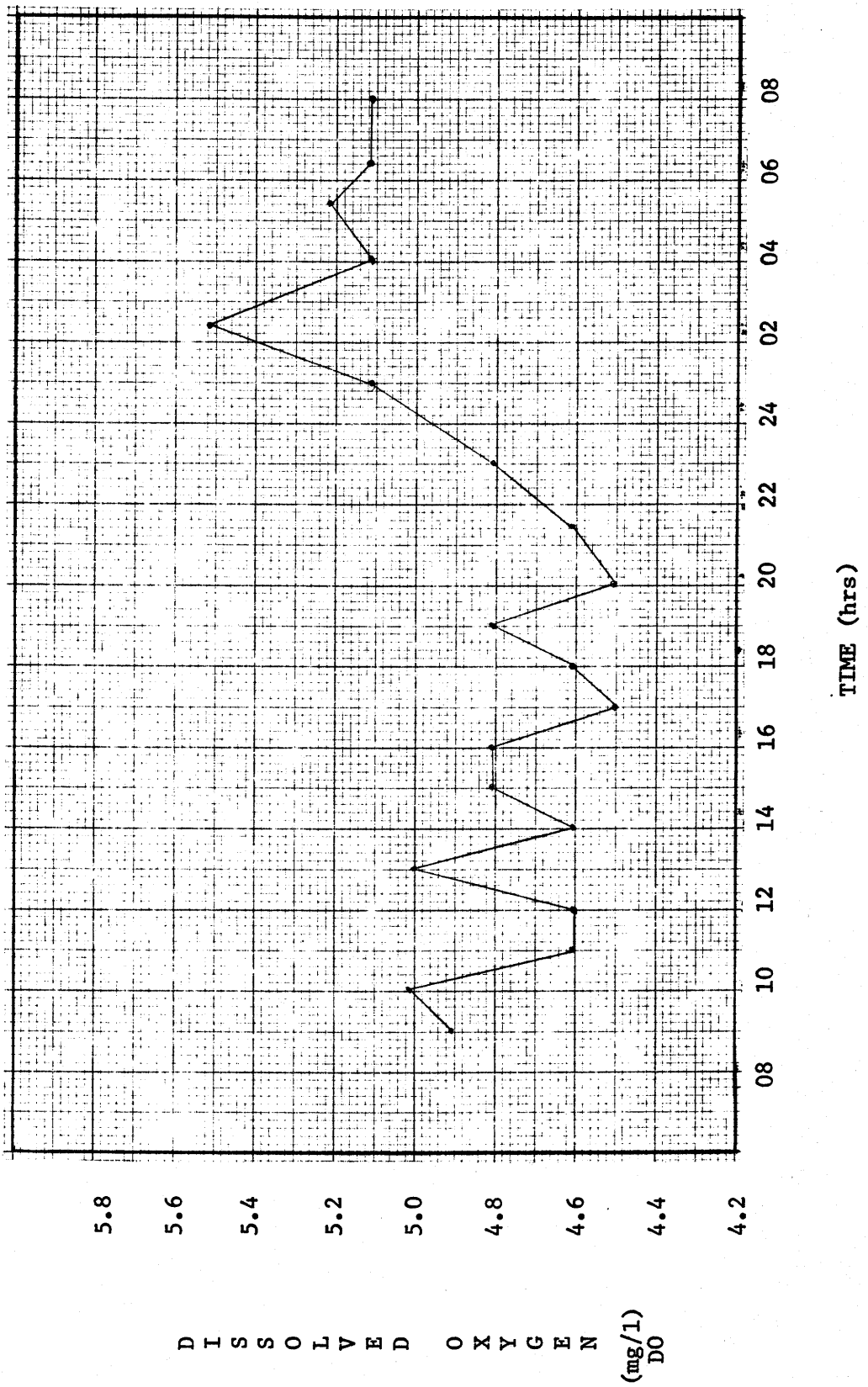


FIGURE 13

DIURNAL OXYGEN STUDY NO. 1: BOD_5

LOCATION: Lehigh River Below Kline's Island (RM 16.1)

DATE: Thursday, 18 July to Friday, 19 July 1974

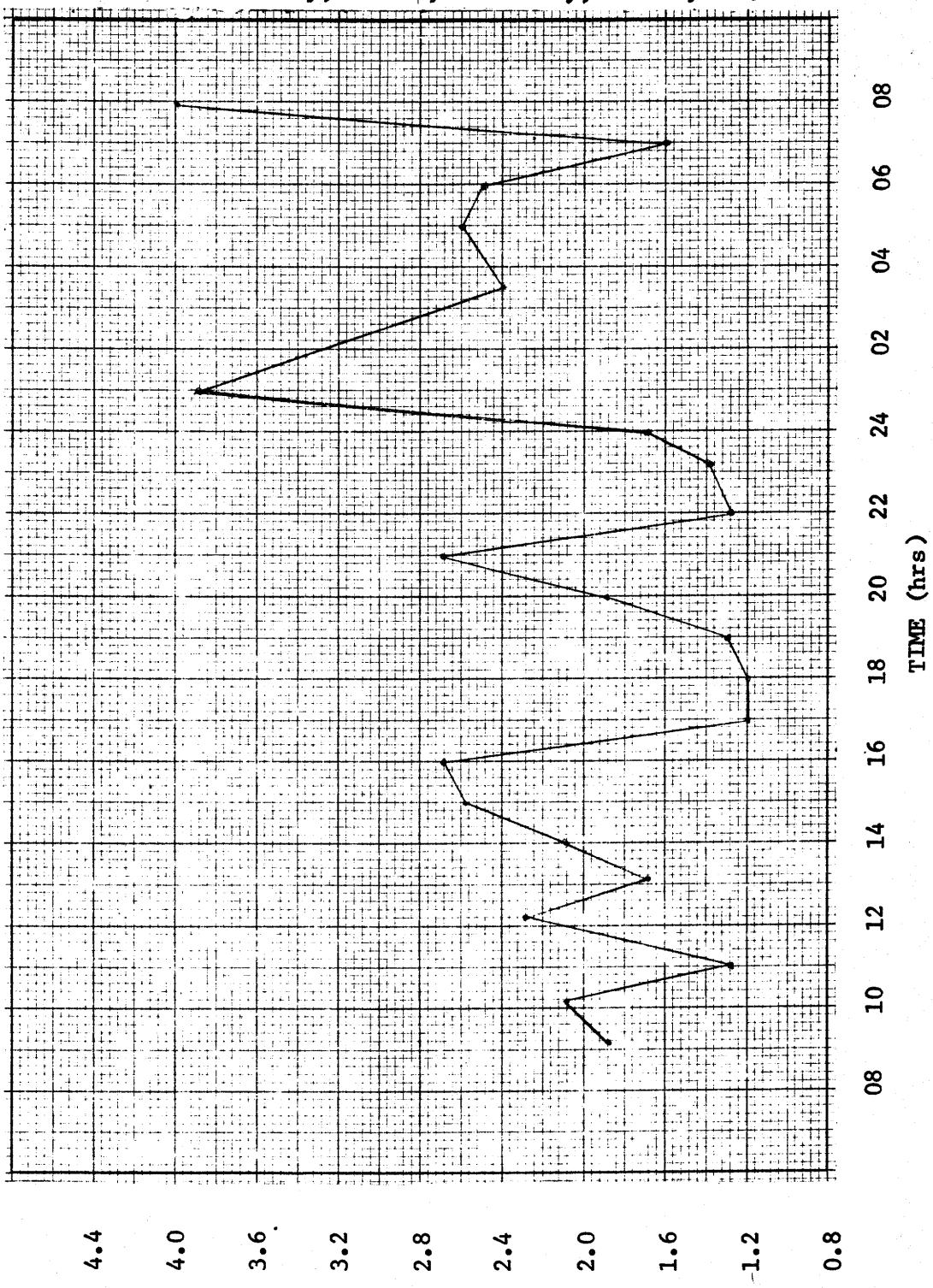


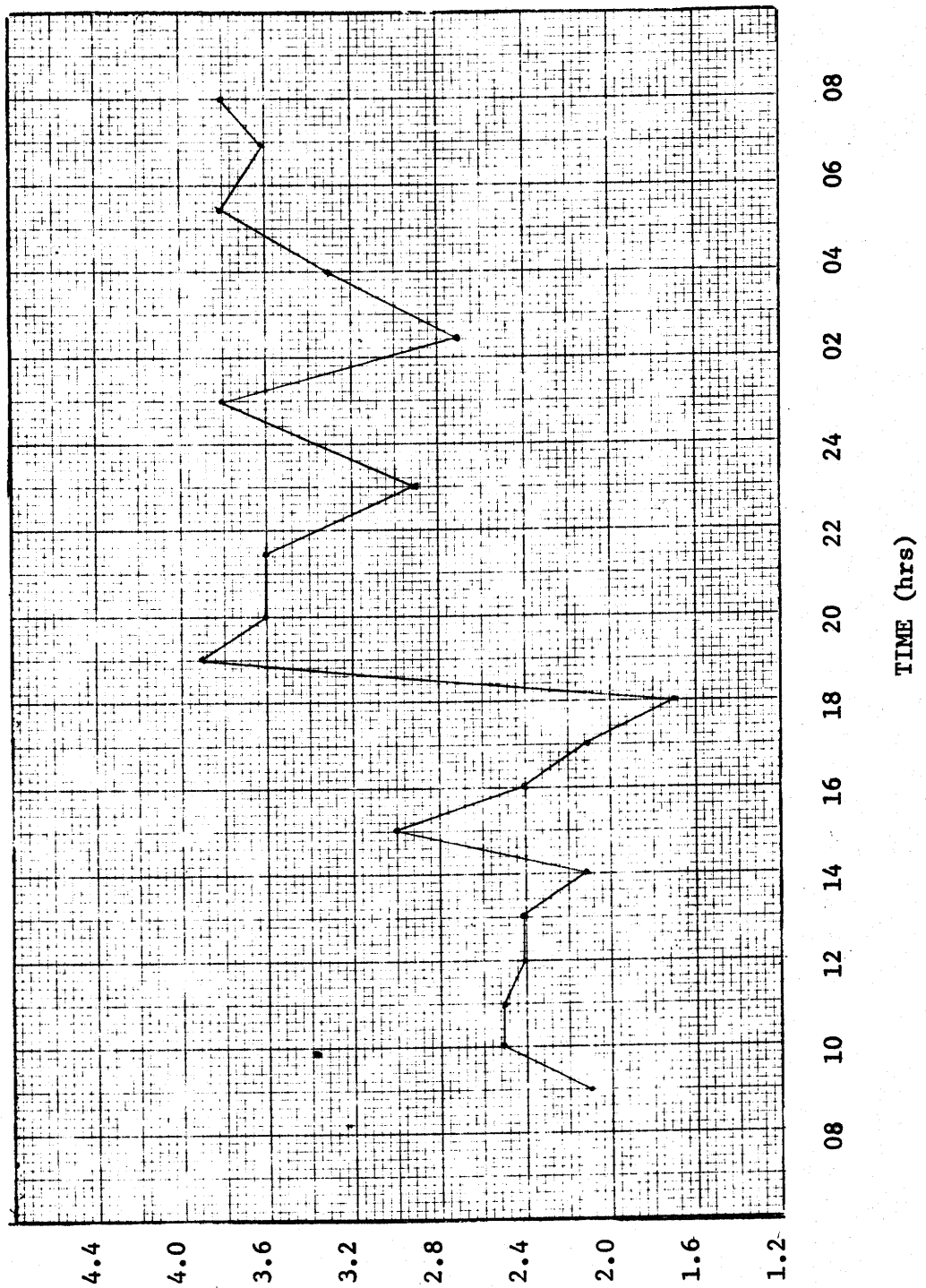
FIGURE 14

DIURNAL OXYGEN STUDY NO. 2:BOD_5

LOCATION: Lehigh River Above Glendon Dam (RM 3.3)

DATE: Thursday 1 August 1974

to Friday 2 August 1974



The AUTOSS model generally predicts the Lehigh River DO within 1 mg/l. The average measured DO for the river from Allentown to Jim Thorpe (RM 15 to 47) is approximately 9 mg/l, or saturated with respect to oxygen for most of the stretch. The five low-head dams definitely contribute to reaeration as shown by the peaks on the DO profile in Figure 15. The predicted values were generally lower and the values entered in the model for reaeration rates at the dams (see Table 10) were not sufficient to produce the same increases, however the sampling locations were such that the excessive aeration probably produced high results.

Study efforts for the DO model were placed on the critical reach from Allentown to Easton, and especially above the Glendon Dam where the DO level sags to 4.5 mg/l, but is soon restored by the dam (RM 3.2). Various factors may account for the decrease. Nitrification of the heavy ammonia nitrogen loadings from Saucon Creek and Bethlehem Steel was assumed to be the major factor in using the AUTOSS model. Other possibilities are sediment uptake behind the dam, low reaeration caused by an oil film from Bethlehem Steel, or chemical oxygen demand from the iron chips from Saucon Creek and Bethlehem Steel being oxidized.

Various computer runs of the AUTOSS model were made to best represent the dissolved oxygen profile. All values used were averages for the summer. In being referenced to river miles in the program, the input data is linearly interpolated between junctions for the chosen 100 section analysis and temperature corrected to the actual river temperatures.

The predicted Lehigh River DO profile was determined by adjusting reaeration rates and NBOD decay rates. A similar profile could be produced by using benthal respiration rate and photosynthesis - respiration rates but these were not as assessible.

TABLE 9

DO, CBOD, and NBOD FOR LEHIGH RIVER STATIONS

River Mile	Concentrations: mg/l					
	BOD_5	CBOD	DO	NO_2	NH_3	NBOD
46.2	1.0	1.4	9.3	0.006	0.424	1.9
41.8	1.4	2.0	9.4	0.005	0.349	1.6
40.4	1.6	2.3	9.5	0.030	0.317	1.5
39.1	1.5	2.2	9.2	0.030	0.514	2.4
37.1	1.4	2.0	8.6	0.008	0.574	2.6
37.0	1.3	1.9	9.3	0.020	0.410	1.9
35.1	1.2	1.7	9.6	0.013	0.401	1.8
33.0	1.7	2.5	9.7	0.020	0.947	4.4
28.5	2.1	3.0	8.6	0.020	0.759	3.5
28.4	-	-	9.3	0.005	0.512	2.4
26.1	1.3	1.9	9.6	0.010	0.429	2.0
23.5	2.4	3.5	8.6	0.006	0.252	1.2
23.4	1.5	2.2	8.9	0.007	1.388	6.4
22.3	1.3	1.9	8.9	0.009	0.339	1.6
21.2	1.5	2.2	8.6	0.010	0.345	1.6
21.1	1.5	2.2	9.0	0.017	0.360	1.7
20.5	1.4	2.0	9.1	0.031	0.306	1.4
19.9	1.7	2.5	9.5	0.030	0.336	1.5
18.8	1.9	2.9	9.8	0.021	0.340	1.6
17.6	2.2	3.2	9.4	0.016	0.210	1.0
17.2	1.9	2.9	9.4	0.018	0.210	1.0
16.9	2.1	3.0	8.7	0.032	0.728	3.4
16.8	2.0	2.9	8.8	0.032	0.669	3.1
16.1	2.9	4.2	9.2	0.052	0.925	4.3
15.1	4.2	6.1	7.6	0.093	1.727	8.0
14.0	2.7	3.9	8.4	0.039	1.251	5.8
12.8	2.7	3.9	8.3	0.034	0.462	2.2
12.1	3.2	4.6	9.0	0.053	0.933	4.4
11.5	3.6	5.2	8.6	0.065	0.938	4.4
10.6	2.8	4.1	8.0	0.319	1.116	5.3
9.5	2.8	4.1	7.4	0.133	1.138	5.3
9.2	4.0	5.8	7.9	0.029	3.588	16.5
8.4	3.2	4.6	7.3	0.027	3.500	16.1
7.3	3.8	5.5	7.1	0.481	2.625	12.6
5.7	4.6	6.7	5.2	0.233	3.150	14.7
5.0	4.4	6.4	4.5	0.291	2.526	11.9
3.2	4.6	6.7	5.4	0.306	2.541	11.9
3.1	4.6	6.7	7.5	0.103	2.226	10.4
2.2	4.4	6.4	7.8	0.278	2.553	12.1
0.9	3.2	4.6	7.9	0.393	2.070	9.9
0.1	4.6	6.7	8.0	0.254	2.500	11.7

TABLE 10

DAMS ON LEHIGH RIVER

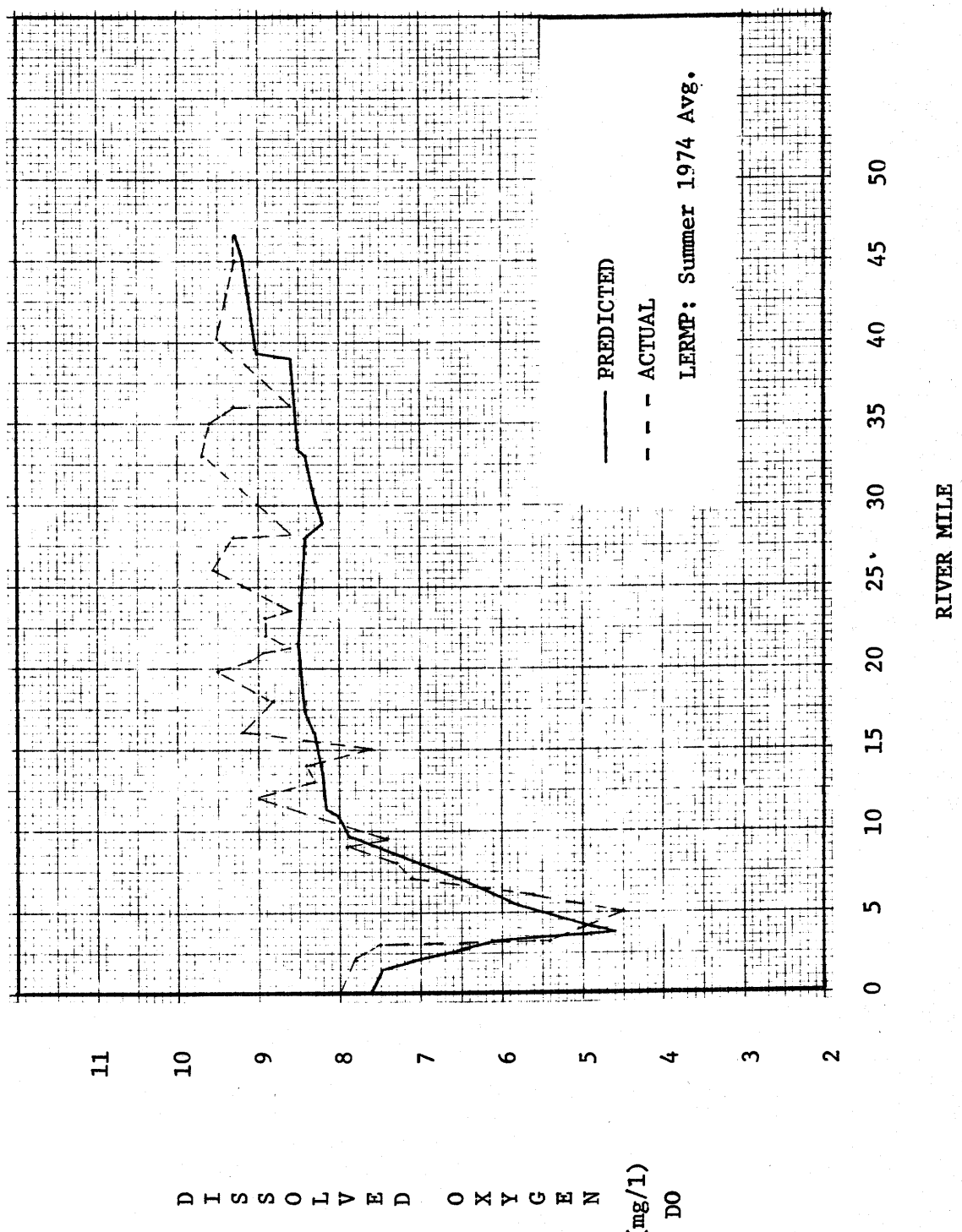
Approximate Size Number[1]	Dam[2]	River Mile	Assumed Reaeration Rate (1/day)
7	Palmerton	37.0	3.
3	Treichlers	28.5	11.
4	Northampton	23.5	10.
6	Hokendauqua	21.2	9.5
5	Allentown: Hamilton Street	16.9	9.
2	Glendon	3.2	12.
1	Easton	0.0	12.

1 Highest to lowest

2 Bowmanstown Dam (RM 39.5) had been washed out in 1955

FIGURE 15

LEHIGH RIVER PROFILE:
DISSOLVED OXYGEN



The bacterial profiles for the Lehigh River had more variation than any other water quality parameters. The predicted values were obtained using a decay rate of 0.3/day, low compared to the range cited in literature of 1.0 to 1.5/day. Because of the lack of time and the data scatter, the model was not calibrated to more accurately predict the river behavior. Also significant bacterial changes were noted after the several periods of precipitation during the summer.

Generally the bacterial counts are high throughout the Lehigh River. Fecal coliform and streptocci concentrations are similar; total coliform concentrations are about 10 times as high. Total coliform range from 600 to 6000 per 100 ml. The Pennsylvania bathing standard of 1000/100 ml is exceeded for most of the Lehigh River studied.

FIGURE 16

LEHIGH RIVER PROFILE:
TOTAL COLIFORMS

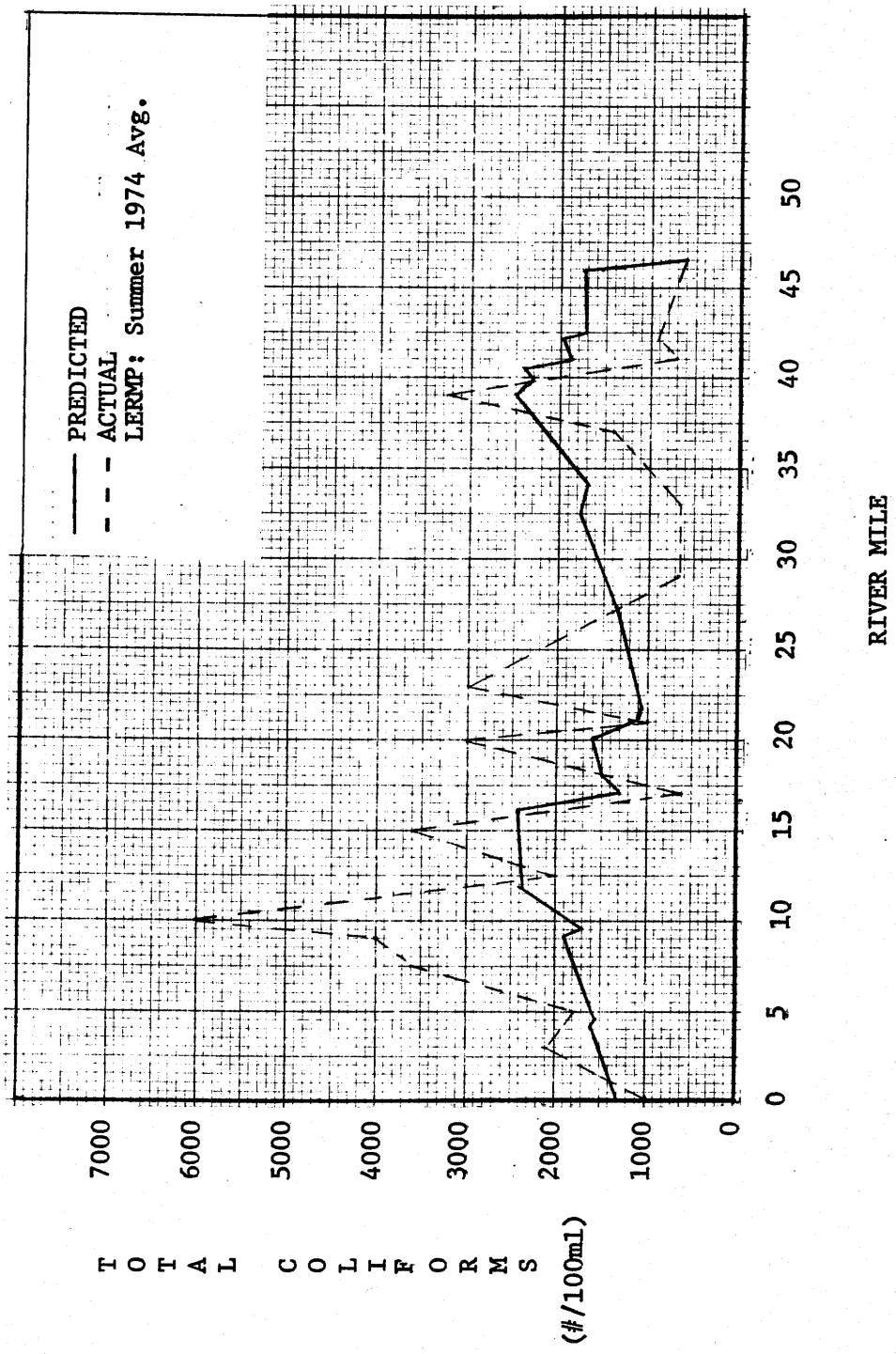


FIGURE 17

LEHIGH RIVER PROFILE:
FECAL COLIFORMS

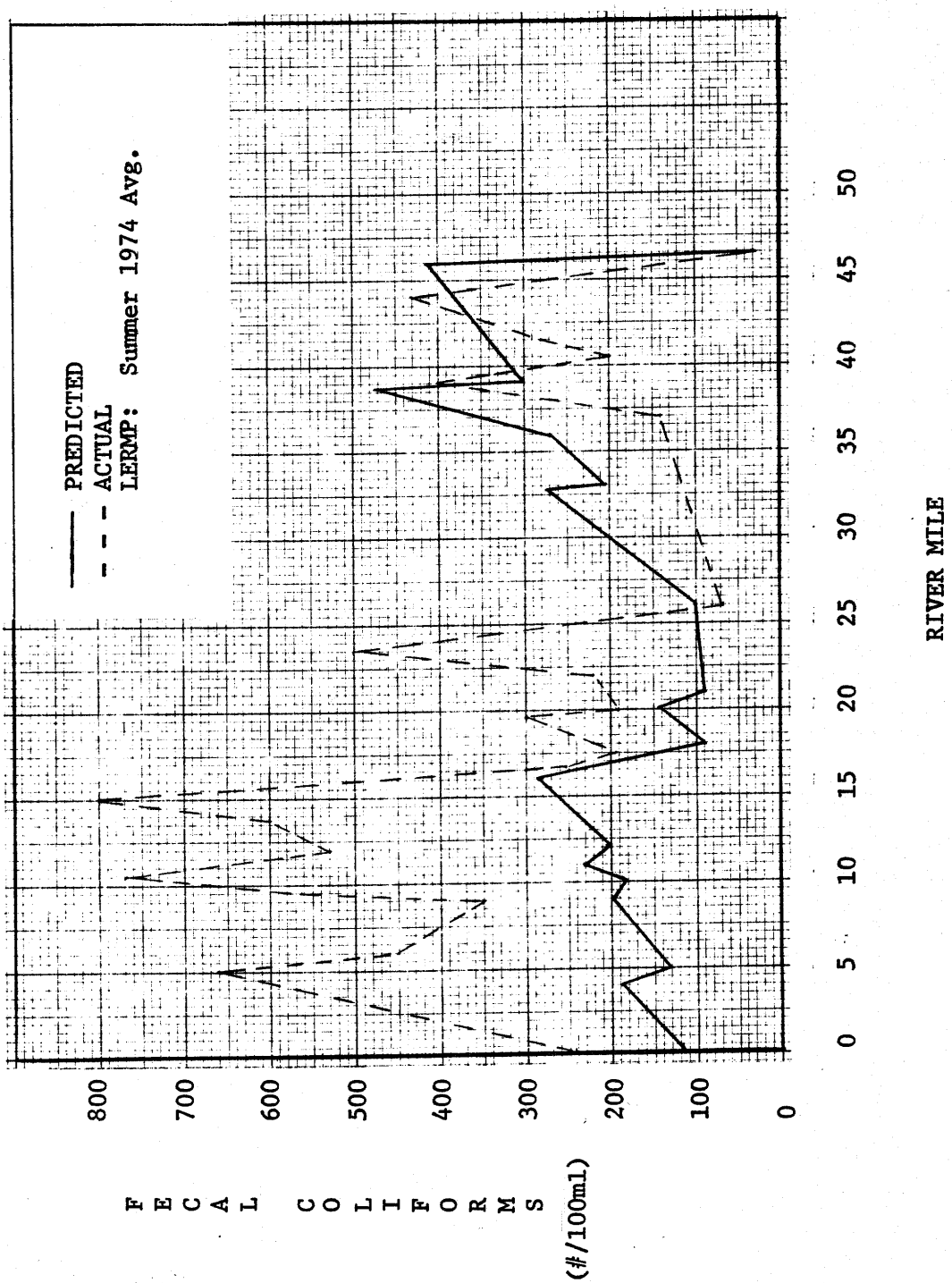
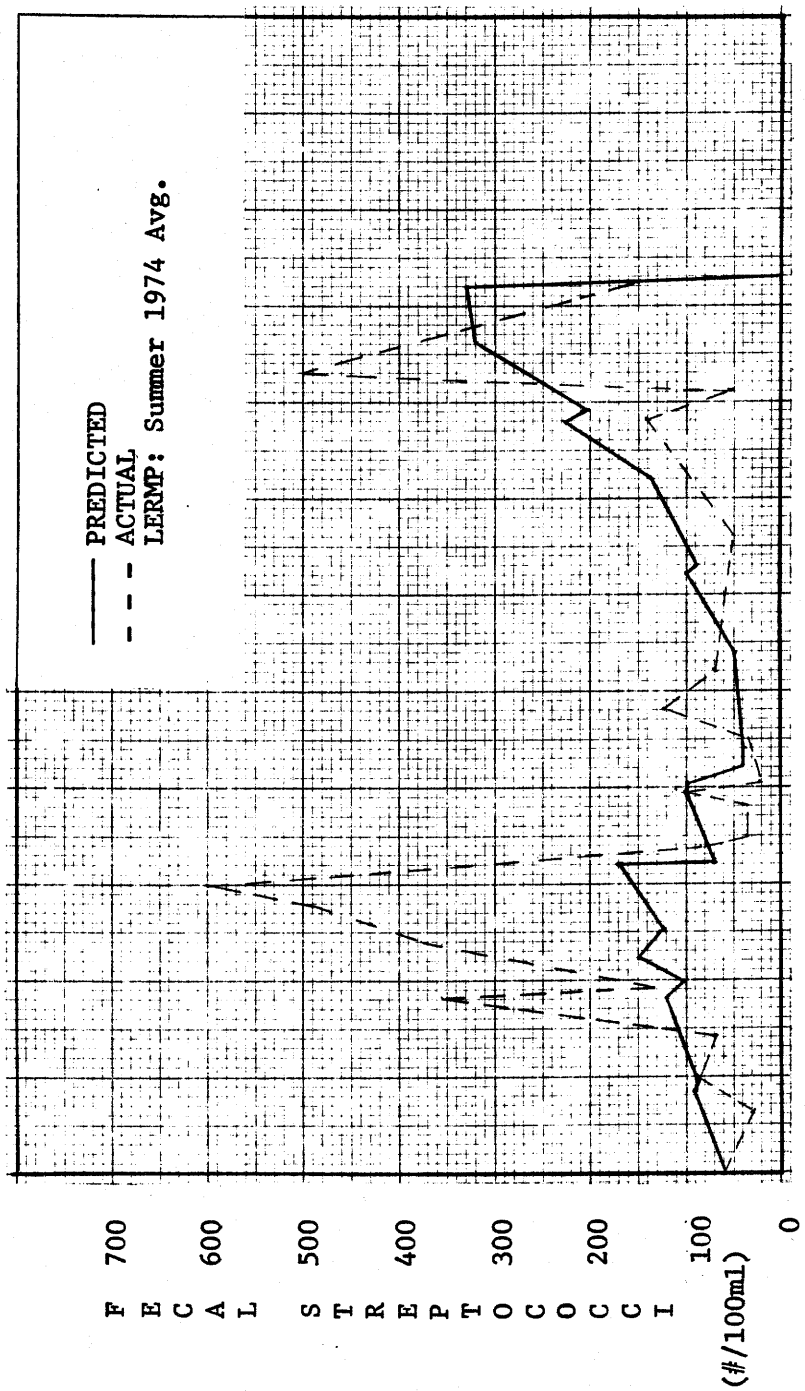


FIGURE 18

LEHIGH RIVER PROFILE:
FECAL STREPTOCOCCI



C. Chemical

The chemical parameters measured are best illustrated in graphs for the river showing the measured actual values and the computer model profile. Each group will be considered separately with respect to their mass balance and interaction within the river. The nitrogen compounds have been considered with the biological parameters because of their interaction with the important oxygen balance of the river.

The profile for pH (Figure 19) shows the initial increase from a low of 6.5 at Jim Thorpe caused by tributaries and flow over calcium carbonate rocks. Generally the pH peak of 8.4 and 8.3 at river miles of 17.5 and 25.0 match the large increases in alkalinity in the river at the Tilghman Street Bridge and Treichlers Dam. The alkalinity of the water is a measure of the buffering capacity and has little water quality significance other than affecting the water palatability at high levels. The pH range of 6.5 to 8.4 and alkalinity of 65 mg/l $CaCO_3$ and less are normal for river water. The computer model mass balance merely indicates the increasing alkalinity trend with the biggest change caused by the high alkalinity in the Allentown Sewage at river mile 16.4. (See Figure 20). A mass balance does not take in account the alkalinity reaction with the water or the contribution from the ground water alkalinity.

FIGURE 19

LEHIGH RIVER PROFILE:
pH

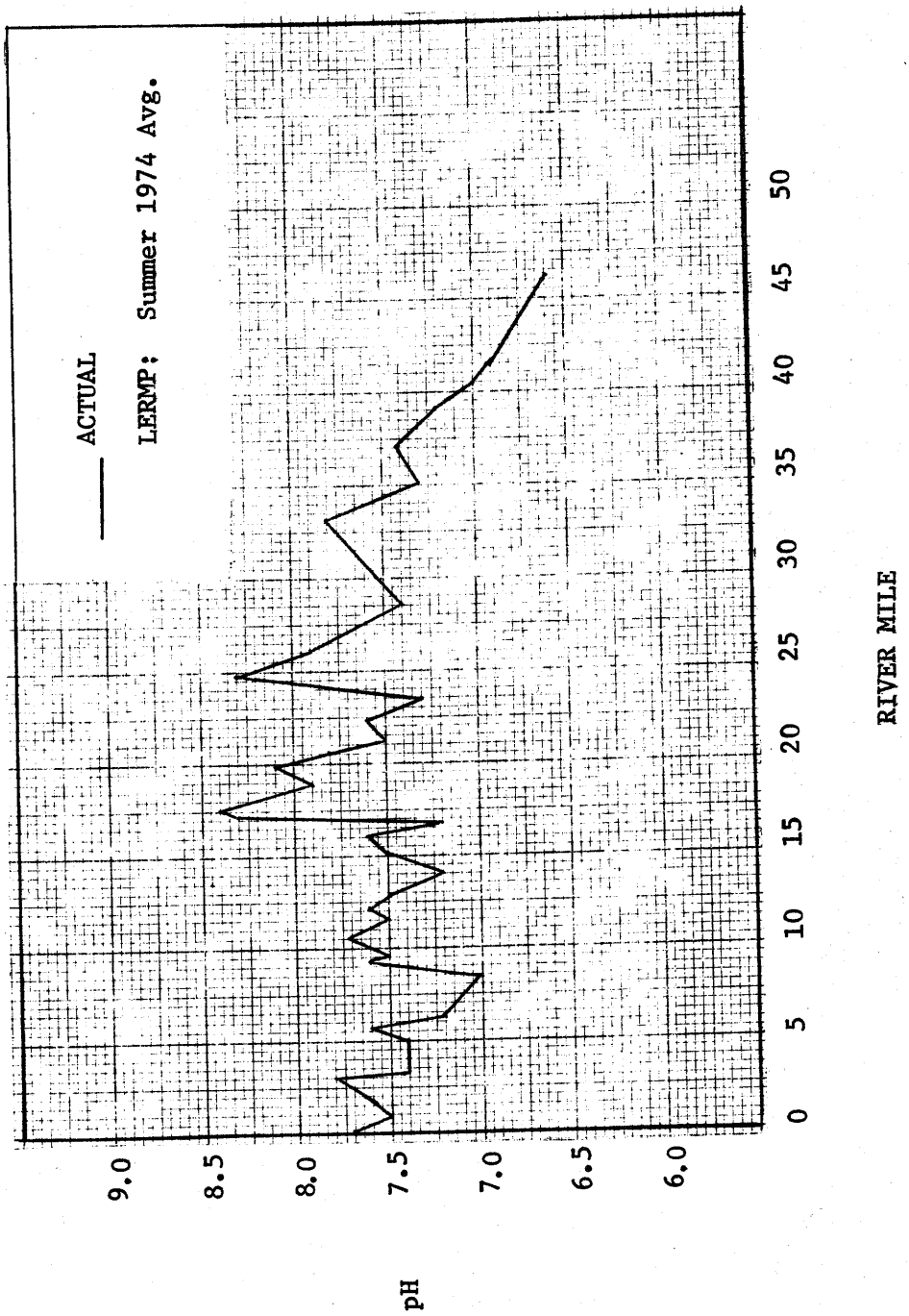
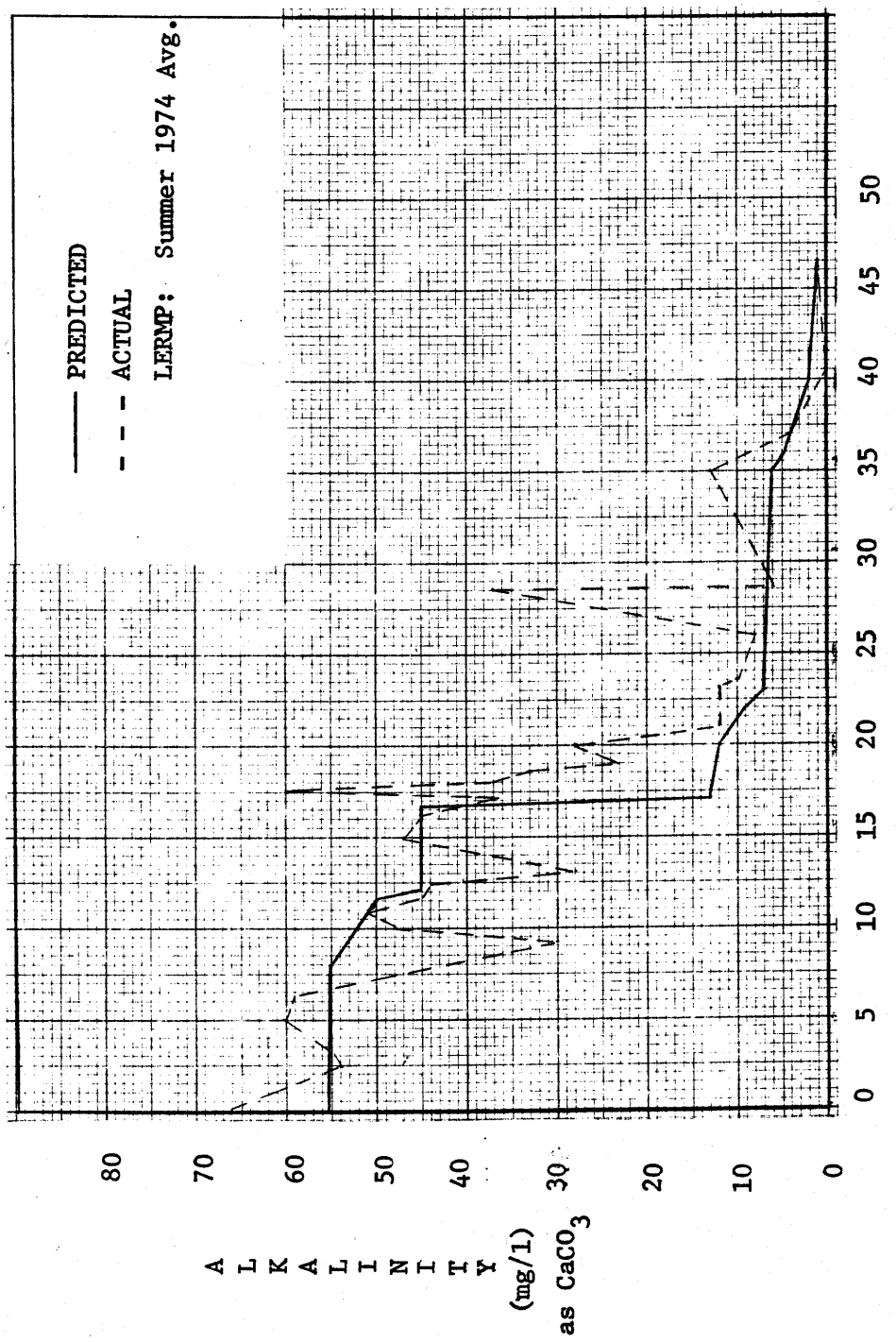


FIGURE 20

LEHIGH RIVER PROFILE:
ALKALINITY



Phosphorous occurs in the water as either orthophosphate, polyphosphate or the molecularly dehydrated form, or organically bound phosphates. The phosphates interact with water and the forms may be soluble, occur in bottom sediments as precipitated inorganic or as part of organic compounds, or they may be within the bodies of aquatic organisms. No algal or bacteria kinetic interaction was considered in simulating the phosphate behavior. These can account for some of the differences between the actual and predicted value of Figures 21 and 22. No sophisticated technique was applied for modeling because of the inconsistencies shown by orthophosphate being greater than total phosphate for several samples. Also the low level and lack of algal blooms indicates phosphates are not a significant water quality problem parameter.

Like with the other chemical constituents hardness shows a large increase around river mile 16.0 at Allentown. Hardness is defined as the sum of the polyvalent cations, expressed as calcium carbonate, with calcium and magnesium being the principle hardness ions. The calcium and magnesium show profiles similar to the hardness but do not directly add up to produce hardness since they are expressed as Ca and Mg respectively. Generally above Allentown the Lehigh River has soft water. The tributary creeks, Allentown Sewage, and Bethlehem Steel raise the water to the moderately hard classification of 75 to 150 mg/l.

Calcium and magnesium, two alkaline earth metals, generally constitute the most abundant cations in freshwater. Their chemical activity is similar, particularly in the formation of carbonate salts. A mass balance on these ions does not account for their variability with pH, temperature, and substrate composition.

The two alkali metals, sodium and potassium, occur in low concentrations. In average soft waters the equivalent concentration of sodium is second to that of calcium; this is the case with the Lehigh River. The ratio of sodium to total cations is important in agriculture and human pathology but is not significant for the Lehigh River. Again there are major concentration increases below the Allentown Wastewater Treatment Plant and Bethlehem Steel Corporation. The AUTOSS conservative constituent model does not predict any of the erratic peaks and valleys of the river profile.

Chloride and sulfate represent the principal anions present in Lehigh River water. Neither occur in unusually high concentrations and they both meet drinking water standards. Below Allentown the concentrations increase significantly in a similar way as the mineral content.

Table 12 shows a mass balance check for the major flow sources having concentrations of hardness, chloride, sulfate, potassium, and phosphate. The various inconsistencies in the mass flow (1000 lbs/day) are readily visible. Besides chemical interactions with the water, sampling and analysis also introduce errors.

FIGURE 21

LEHIGH RIVER PROFILE:
TOTAL PHOSPHATE

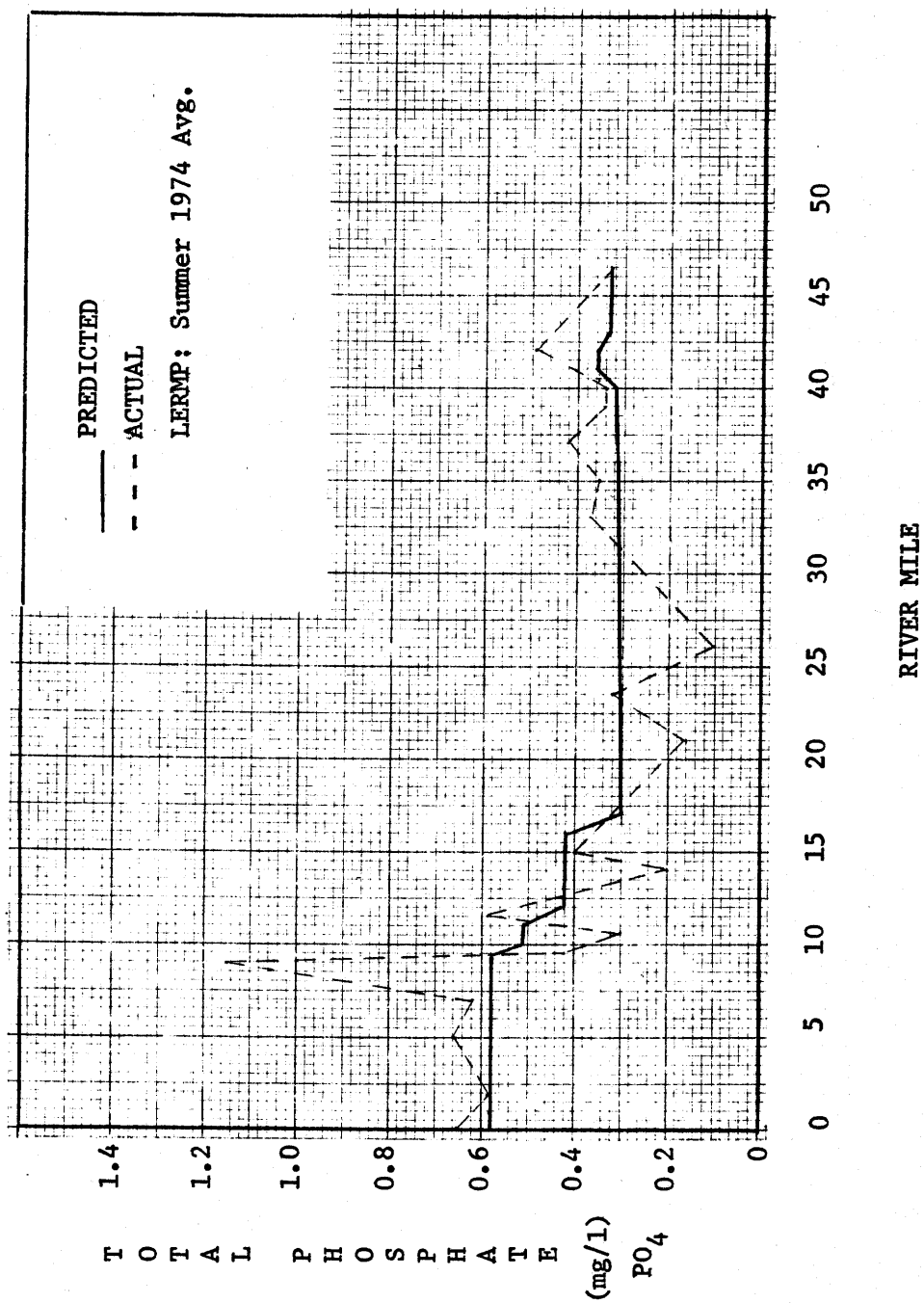


FIGURE 22

LEHIGH RIVER PROFILE:

ORTHOPHOSPHATE

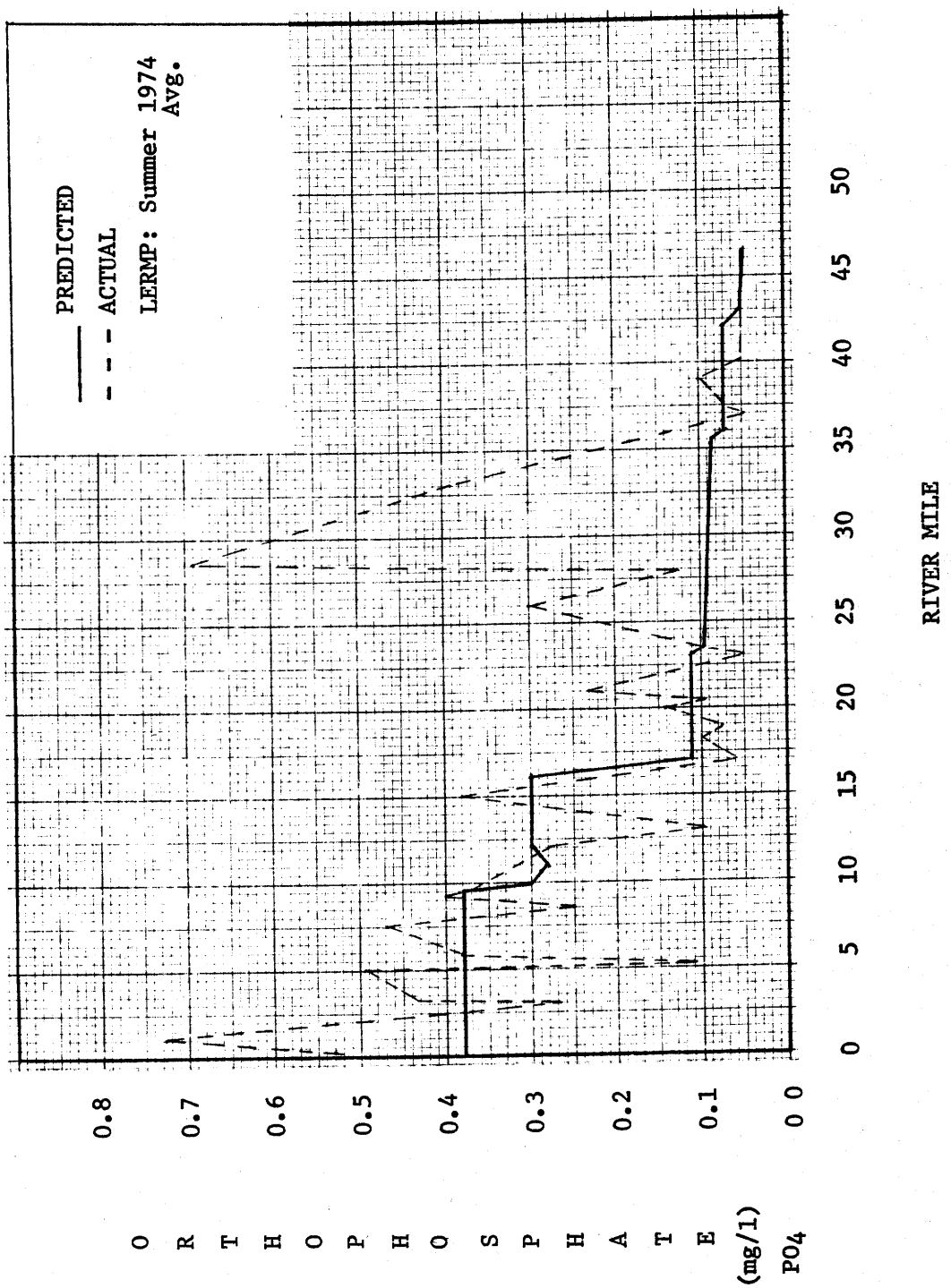


FIGURE 23

LEHIGH RIVER PROFILE:
HARDNESS

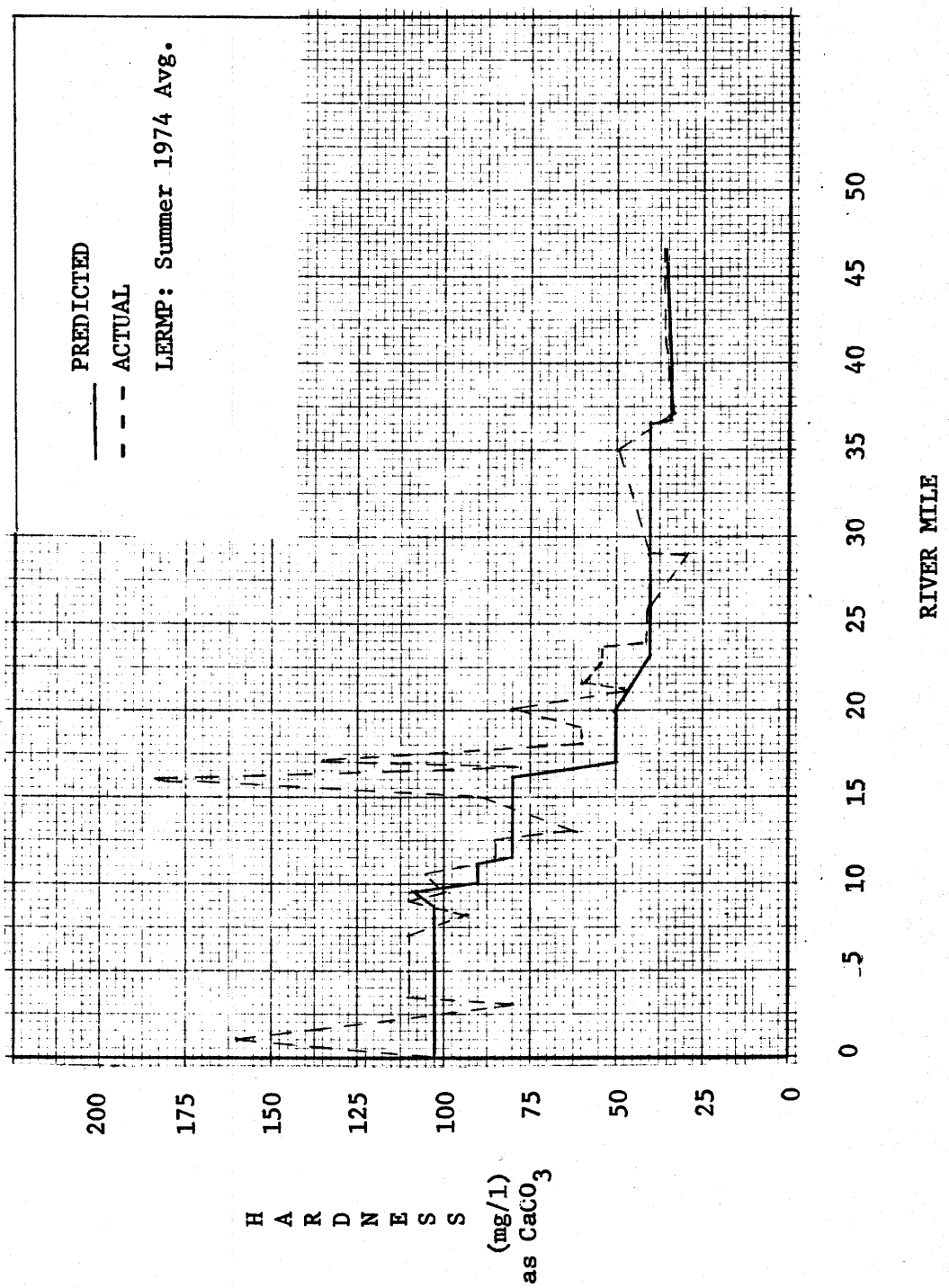


TABLE 11

HARDNESS MASS BALANCE

Location	River Mile	Flow (cfs)	Hardness Conc. (mg/1)	Mass Flow (10^3lbs/day)	Calculated Mass Flow (10^3lbs/day)
River above Palmerton	37.5	670	31	112	112
NJ Zinc #1	37.4	0.3	23	.04	
#8	36.8	1.33	60	.43	+ 32
#9	36.5	1.62	62	.54	
Aquashicola	35.9	70.9	79	30.18	
River below Palmerton	35.0	672	51	185	144
River at Allentown	16.8	770	82	340	340
Allentown Sewage	16.4	54.7	222	65.44	+179
Little Lehigh	16.1	124.5	169	113.41	
River below Allentown	15.1	950	86	440	519
River at Bethlehem	11.5	950	84	430	519
Monocacy Creek	11.3	57.1	261	80.31	
Bethlehem Steel #3	11.5	6.0	60	1.94	
#7	11.0	99.0	103	5.50	
#8	10.9	14.2	100	7.65	
#9	10.9	14.6	98	7.70	
#10	10.8	10.2	126	6.93	
#11	10.6	8.6	112	5.19	
#12	10.3	1.3	110	0.77	+ 86
#13	10.2	8.4	107	4.84	
#15	10.2	0.9	105	0.51	
#16	10.2	1.4	103	0.77	
#17	10.1	53.6	100	28.89	
#18	10.1	10.7	118	6.81	
#19	10.0	6.3	107	5.63	
#20	9.8	6.7	110	3.97	
Bethlehem Steel Intakes	10.6	-205.8	100	111.	-111
River before Saucon	9.5	986	100	532	494
Saucon Creek	9.4	92.0	175	87.	+ 87
River at Freemansburg	9.2	1078	114	662	581
Nancy Run	8.5	8.62	256	12	+ 12
River below Steel City	8.4	1050	88	498	593

FIGURE 24

LEHIGH RIVER PROFILE:
CALCIUM

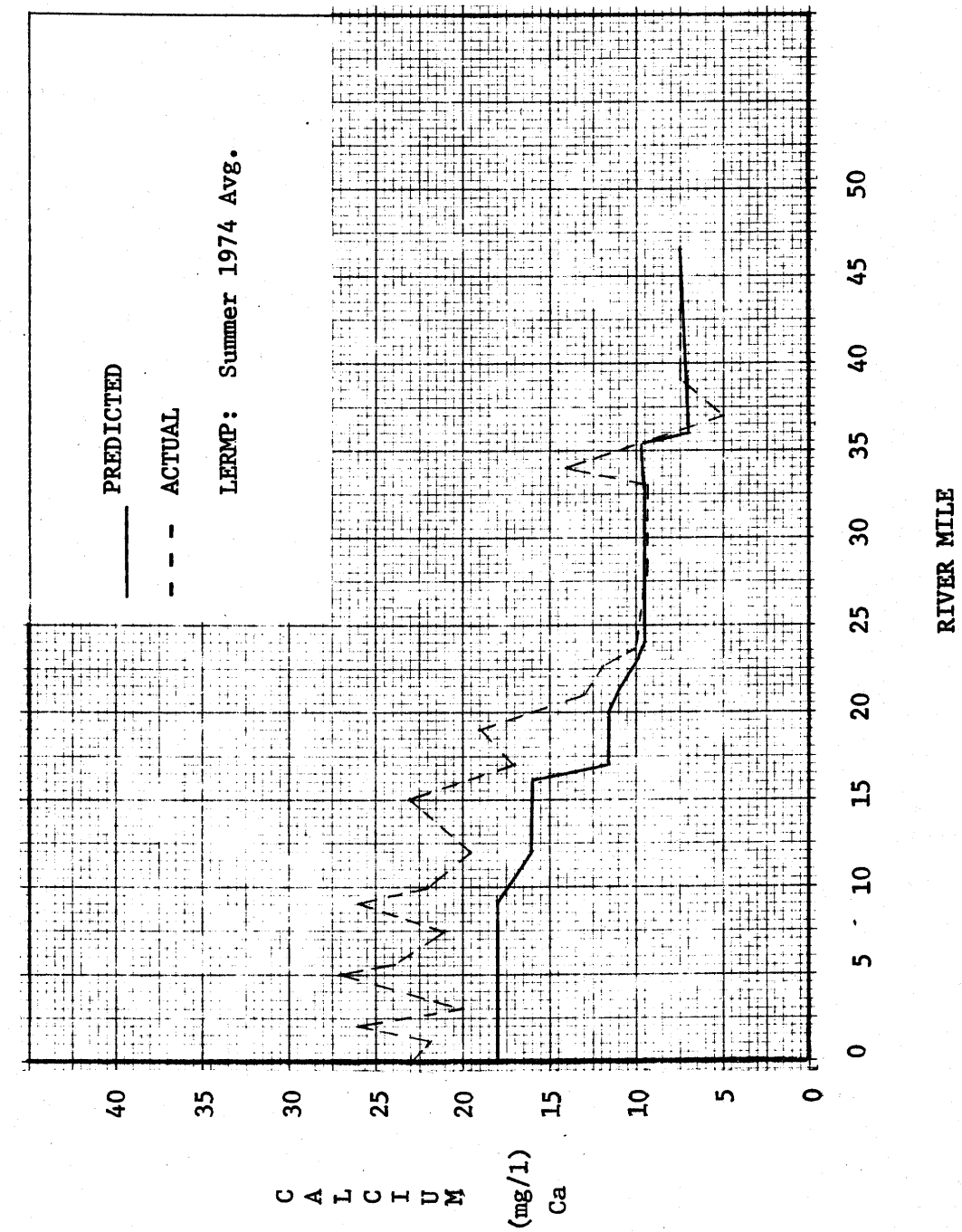


FIGURE 25

LEHIGH RIVER PROFILE:
MAGNESIUM

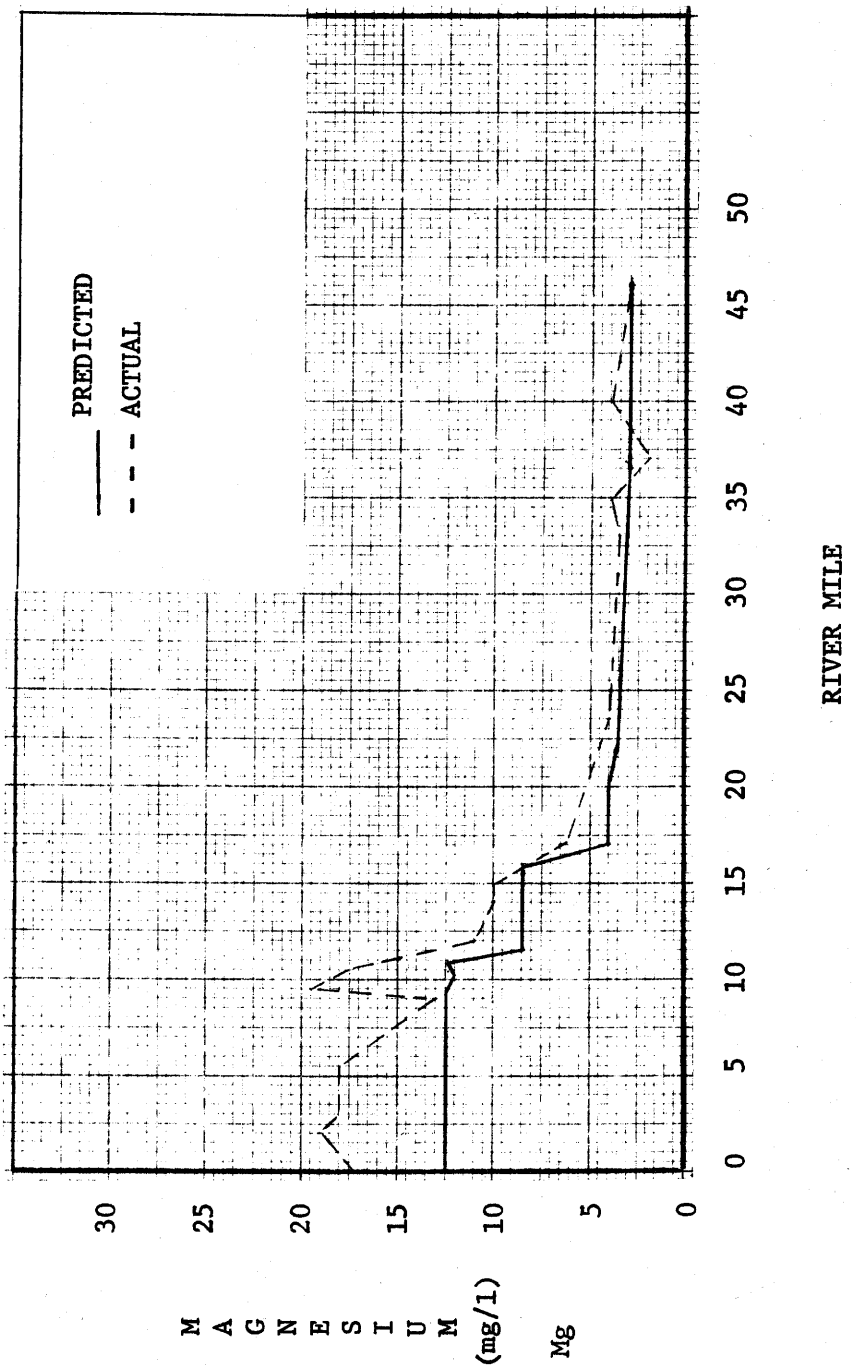


FIGURE 26

LEHIGH RIVER PROFILE:
SODIUM

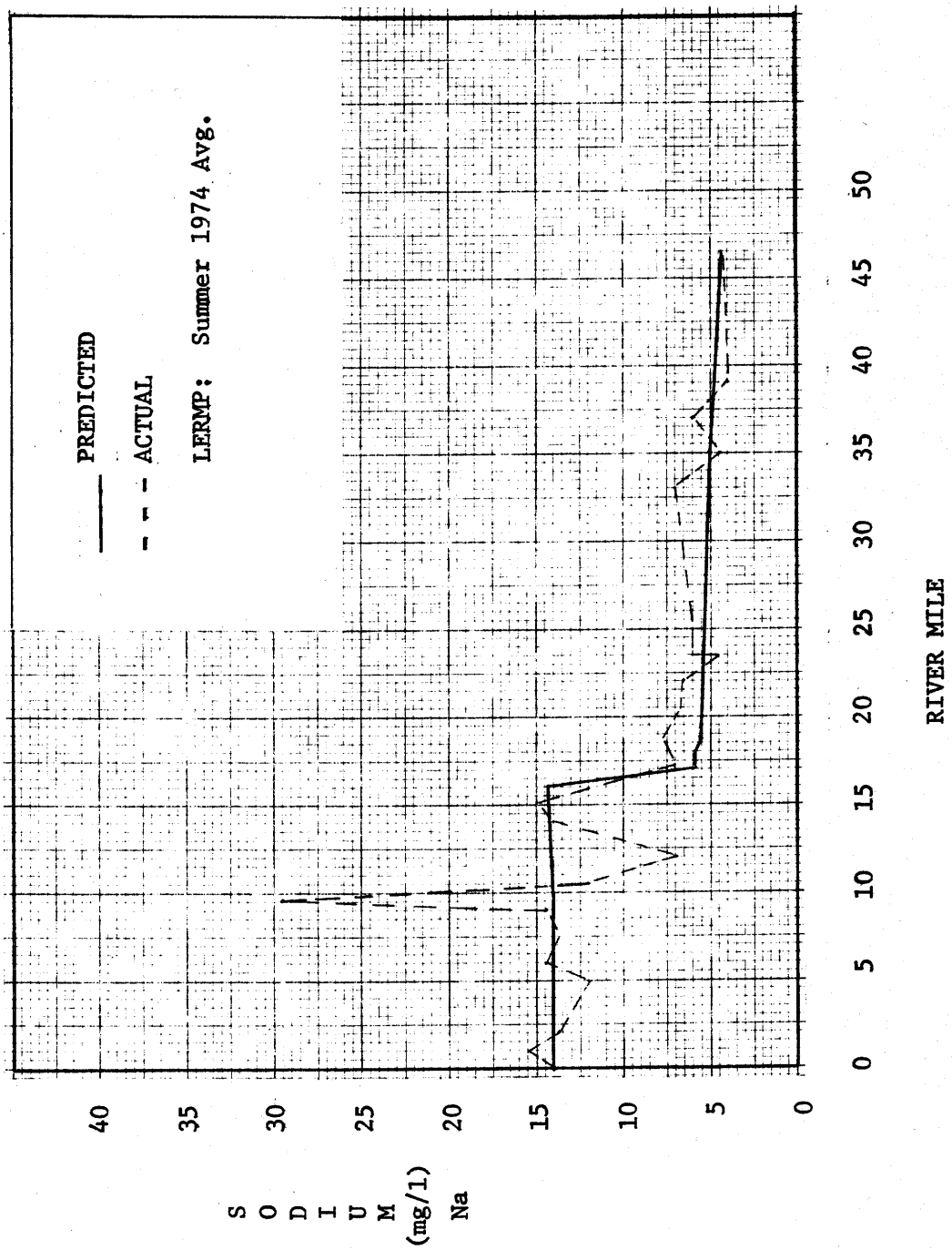


FIGURE 27

LEHIGH RIVER PROFILE:
POTASSIUM

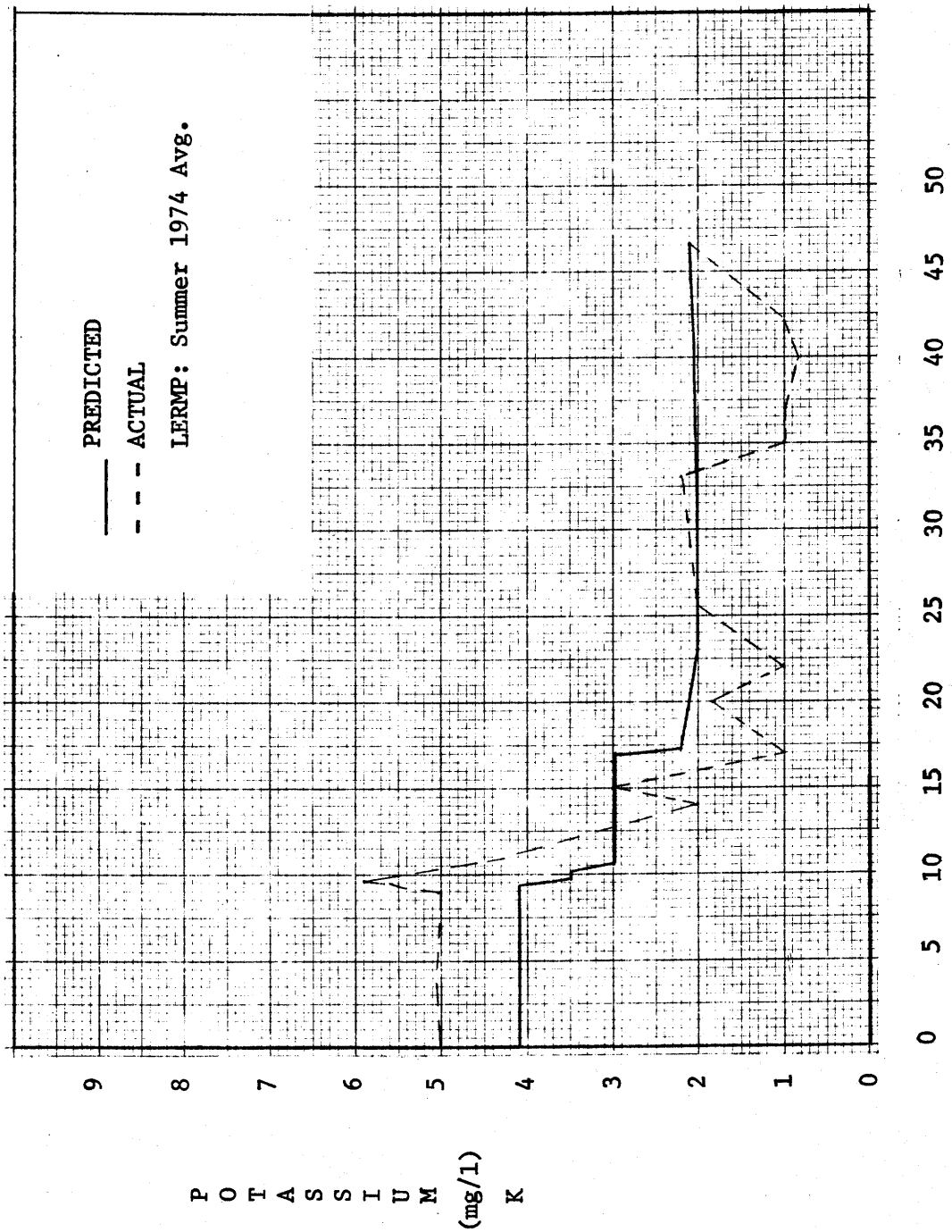


FIGURE 28

LEHIGH RIVER PROFILE:
CHLORIDE

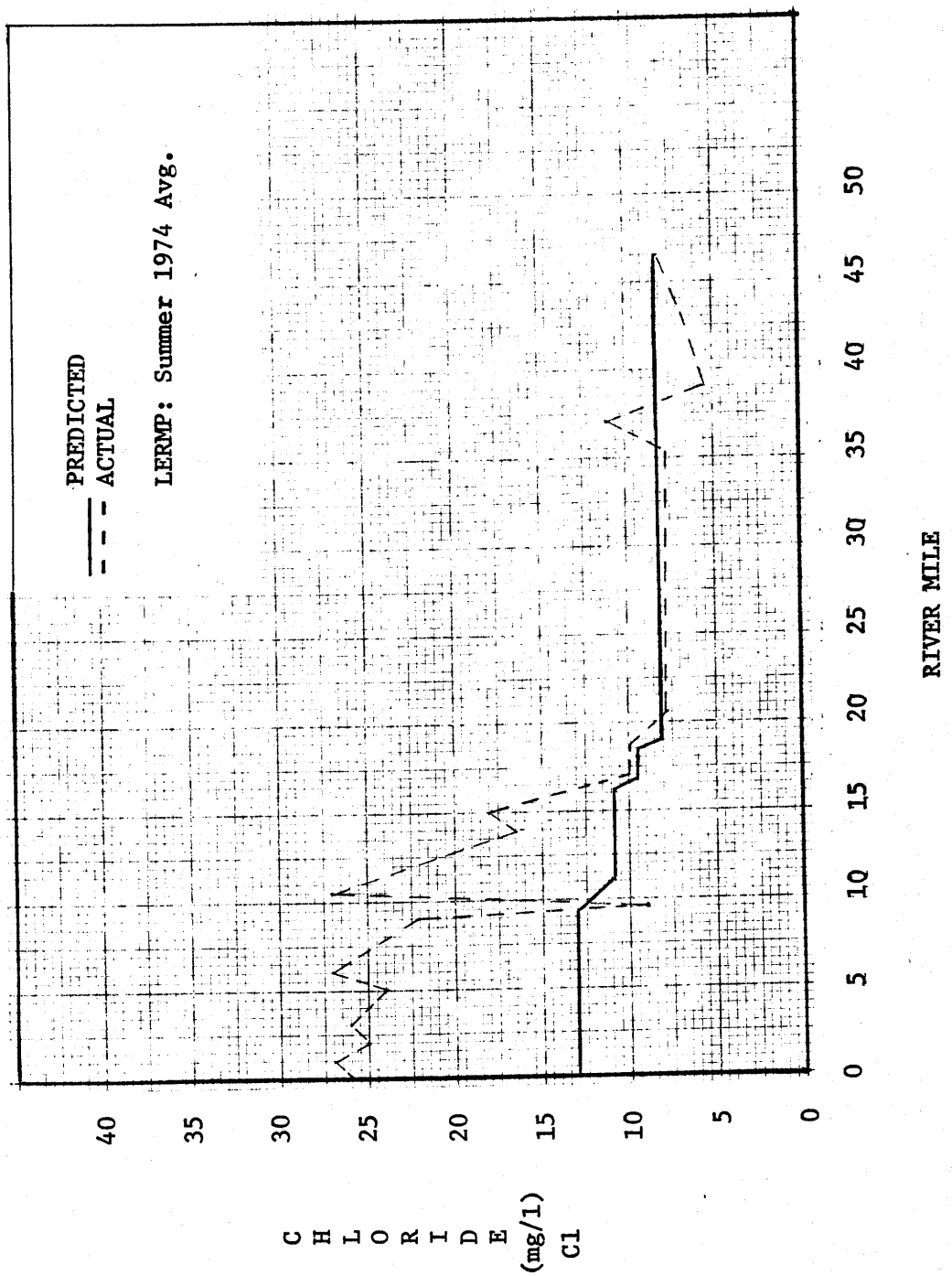


FIGURE 29

LEHIGH RIVER PROFILE:
SULFATE

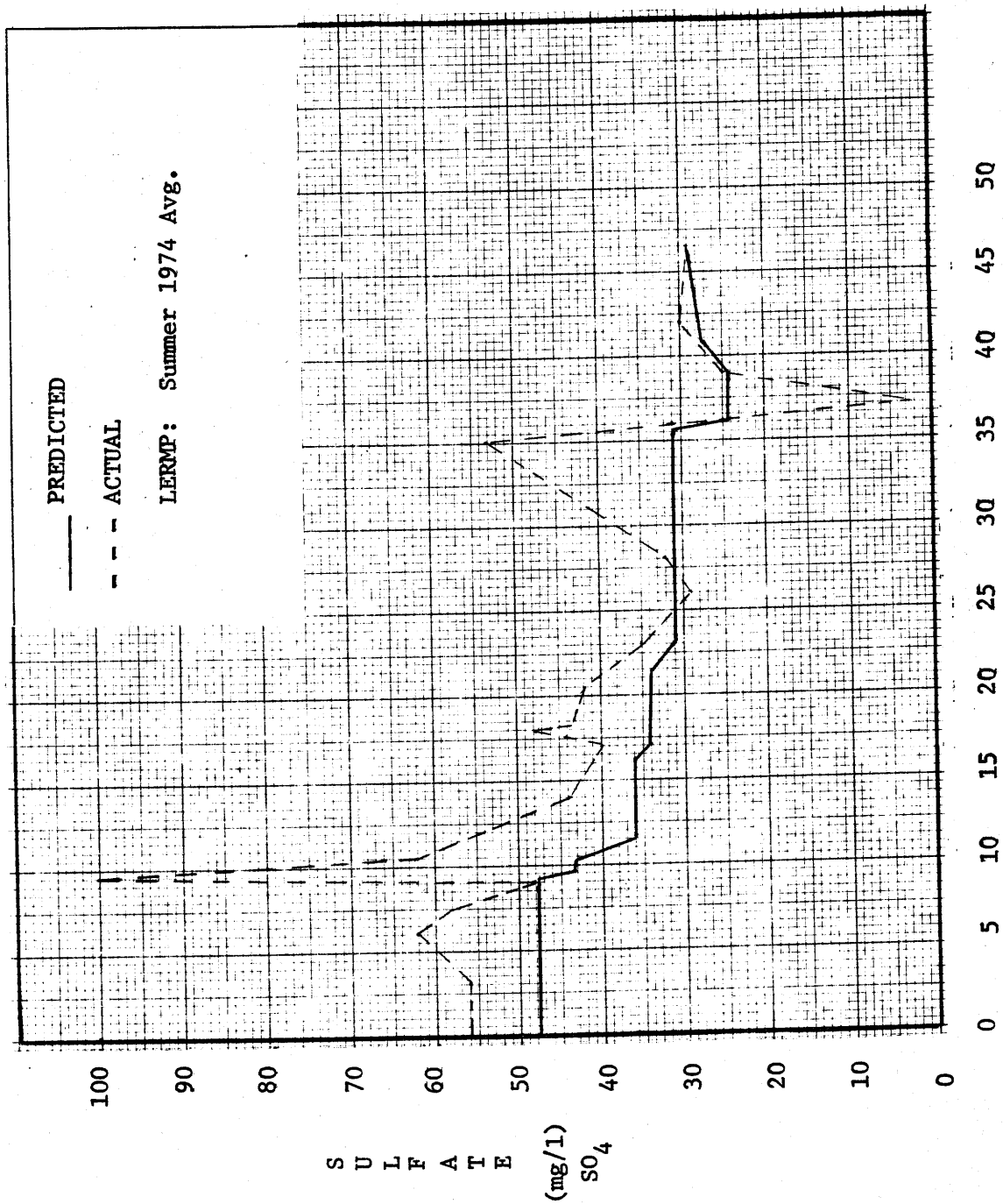


TABLE 12

MASS BALANCE: Cl, SO_4, K, PO_4

Location	River Mile	Mass Flow: 10^{-3}lbs/day			
		Cl	SO_4	K	PO_4
River above Palmerton	37.5	39.7	9.75	3.61	1.53
N.J. Zinc	37.	+ 0.55	+ 0.59	+ 0.01	+0.00
Aquashicola	35.9	2.3	33.2	0.65	0.1
River below Palmerton	35.0	25.4	193.	2.90	1.29
River at Allentown	16.8	43.6	162.	4.56	----
Allentown Sewage	16.4	+ 1.92	+ 21.6	+3.22	+0.68
Little Lehigh	16.1	+ 9.71	+ 22.3	+1.94	+0.12
River below Allentown	15.1	92.2	219.	15.3	2.06
River at Bethlehem	11.5	92.2	221.	18.0	3.02
Monocacy Creek	11.3	+ 1.23	+ 8.74	+ 1.23	+0.17
Bethlehem Steel	10-11	+ 26.1	+ 71.8	+ 7.83	+0.46
(Beth Steel Intakes)	10.6	- 21.1	- 55.5	- 5.55	-0.44
River before Saucon Creek	9.5	47.8	532.	34.6	2.48
Saucon Creek	9.4	12.9	48.0	5.66	0.64
River at Freemansburg	9.2	131.	278.	31.4	6.74
Nancy Run	8.5	0.72	1.95	0.01	0.00
River at Saucon Power Lines	7.3	139.	340.	30.6	3.56

SUMMARY AND CONCLUSIONS

The primary objective of this NSF Student Originated Study was to apply a mathematical model to Lehigh River water quality. The limitations of water quality data necessitated an extensive sampling program and hydrologic monitoring. However, many assumptions and approximations still had to be made in the analysis. The AUTOSS model does provide a basis for further studies.

There is no single factor, physical, chemical, or biological, which can be used alone to indicate the quality of a river, but this study concentrated on dissolved oxygen in addition to measuring many other chemical constituents. The EPA AUTOSS steady state model permitted easy input data manipulation for calibration and its graphical output made for easy analysis.

The following specific conclusions can be made:

(1) The low-head dams on the Lehigh River introduce an unknown benthal oxygen demand but significantly aerate the water flowing over.

(2) Reaeration coefficients(K_2) input to the model range from about 0.5 to 10.0 /day.

(3) The effect of photosynthesis is not signifcant for the Lehigh River.

(4) Carbonaceous biochemical oxygen demand (CBOD) was determined from BOD_5 using a typical decay coefficient (K_c) of 0.23/day.

(5) Nitrogenous biochemical oxygen demand (NBOD) is significantly exerted from Saucon Creek (RM 9.4) to Glendon Dam (RM 3.2) and a decay rate (K_n) 0.4/day has been applied to the river. Otherwise below Allentown, K_n is 0.1/day and above Allentown it is zero when used in the model.

(6) The DO is near saturation at 9 mg/ℓ until the river reaches Allentown; the model predicts the following de degradation within 0.5 mg/ℓ DO.

(7) DO sags to 4.5 mg/ℓ below Bethlehem which is less than the Pennsylvania recommended limit of 5.0 mg/ℓ for a minimum daily average.

(8) The average Lehigh River flow during the summer of 1974 ranged from 400 cfs at Jim Thorpe (RM 46.5) to 1045 cfs at Glendon (RM 6.5) and temperature ranged from 20°C to 27°C in this stretch.

(9) Generally the Lehigh River water quality, except bacteriological, is good from Jim Thorpe to Allentown.

(10) From Allentown (RM 16.0) to Glendon (RM 3.0) the major contributors to flow and water quality degradation are Allentown sewage, Little Lehigh Creek, Monocacy Creek, Bethlehem Steel, and Saucon Creek. which contains Bethlehem Sewage flow.

(11) Most coliform counts in the 47 mile stretch exceed the bathing water requirements of less than 1000 per 100 ml.

(12) Applying the conservative constituent AUTOSS computer analysis to the chemical constituents produced profiles which approximately matches the actual river behavior; none show unusually high values.

(13) The model applied to bacteriological constituents was the poorest in predicting the actual values; the decay rates for the river were not adjusted from the constant 0.3/day.

RECOMMENDATIONS

As a result of the investigations reported, the following recommendations are made:

1) For conditions other than steady state summer flow, develop a hydrodynamic model to estimate stream velocities, time of travel, and reaeration rates.

2) Concentrate on refining the DO model in the lower river by further water quality field studies to estimate reaeration rates, CBOD and NBOD decay rates, and benthal demand behind the dams.

3) Instead of grab samples, do composite sample monitoring of the two major effluents and accurately measure the daily flow. This would better represent the pollutant load from the industries.

4) Attempt to evaluate any non-point source loadings.

5) Because of their low concentrations there is no need to refine a model of most of the chemical ions measured.

6) Isolate the sources of bacterial contamination and try to determine decay rates in the river.

7) Analyze the water and sediments for various heavy metals.

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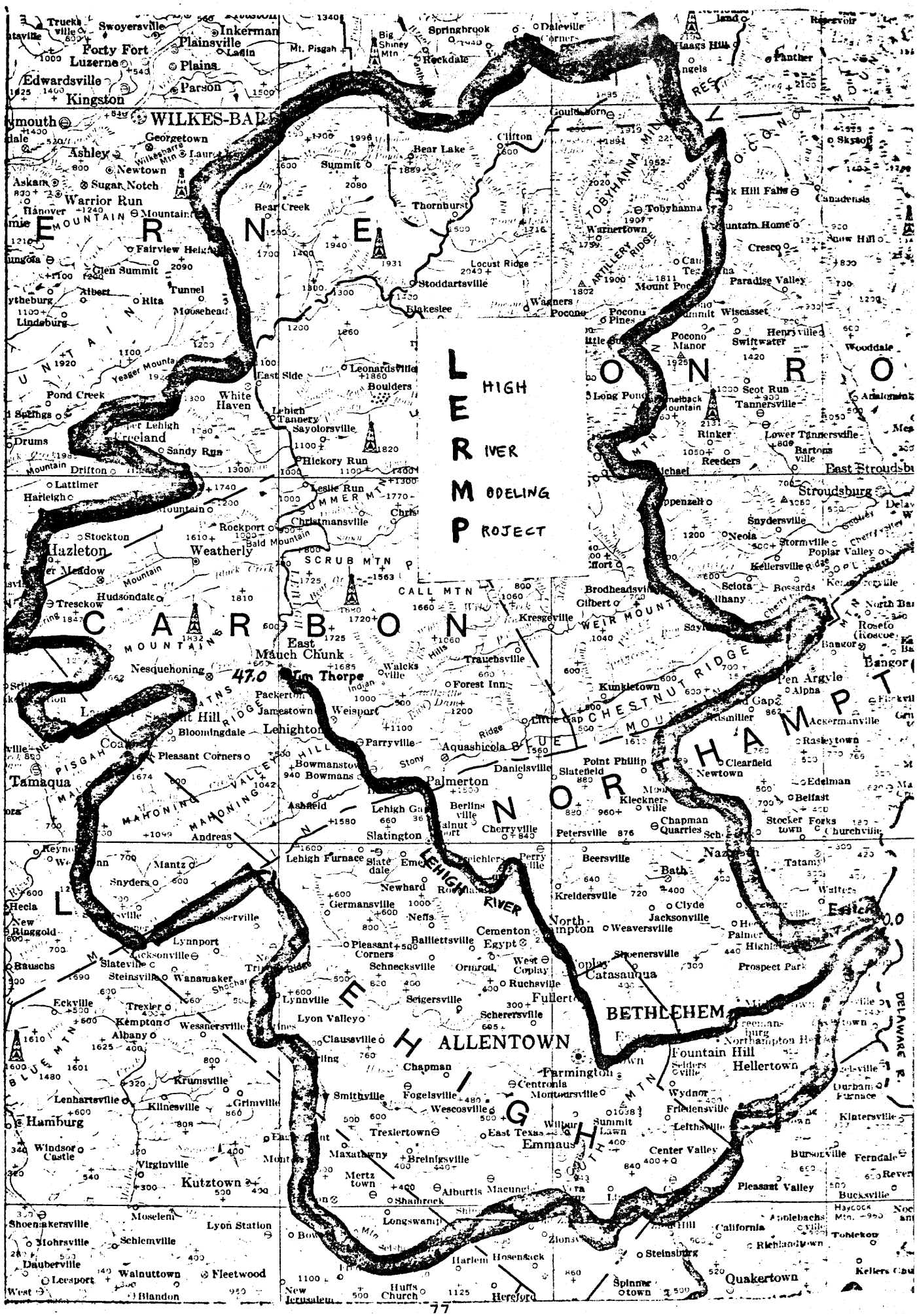
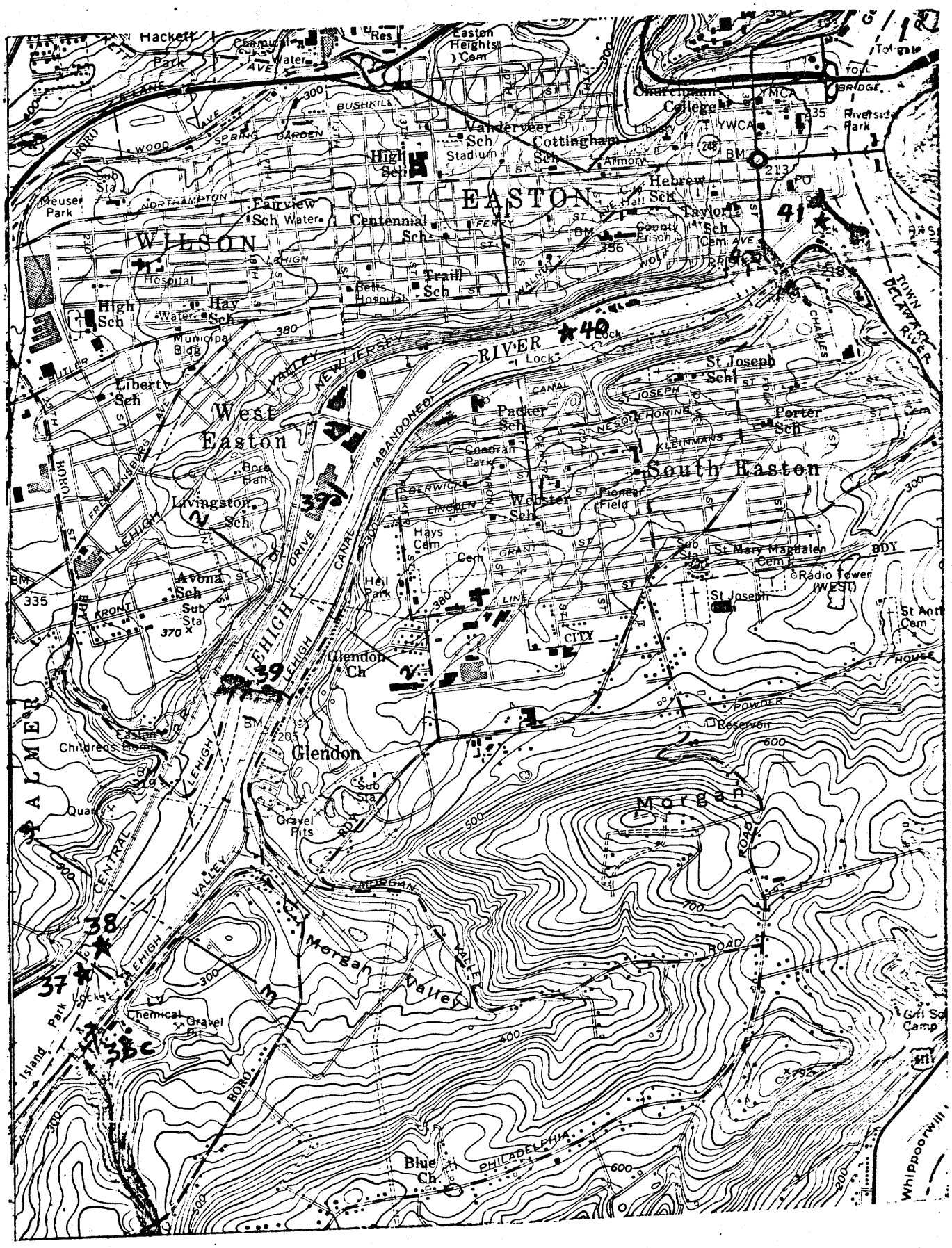
APPENDIX A

Maps

LEHIGH RIVER DRAINAGE BASIN



LEHIGH RIVER: MILE 0.0 to 3.6



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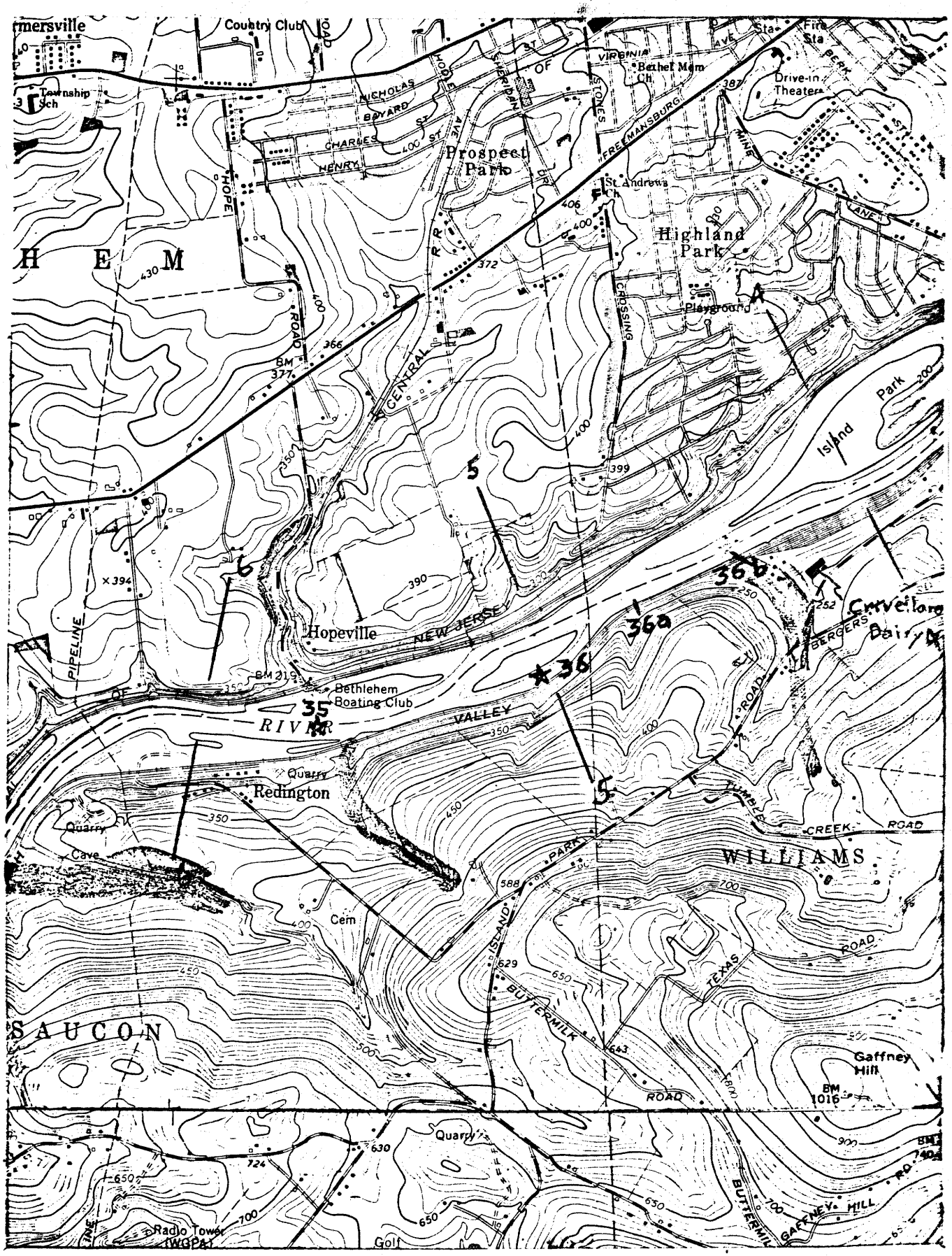
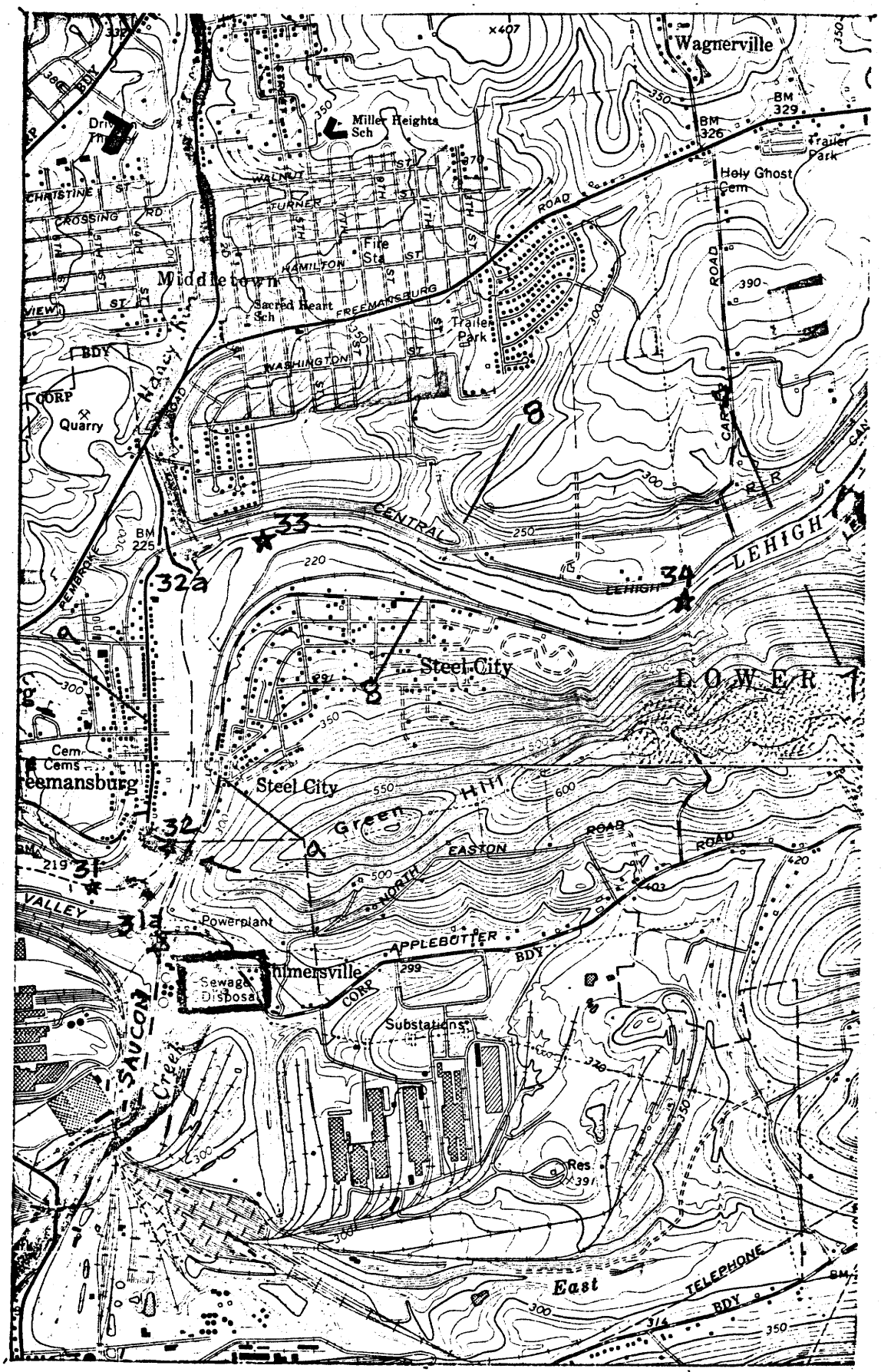
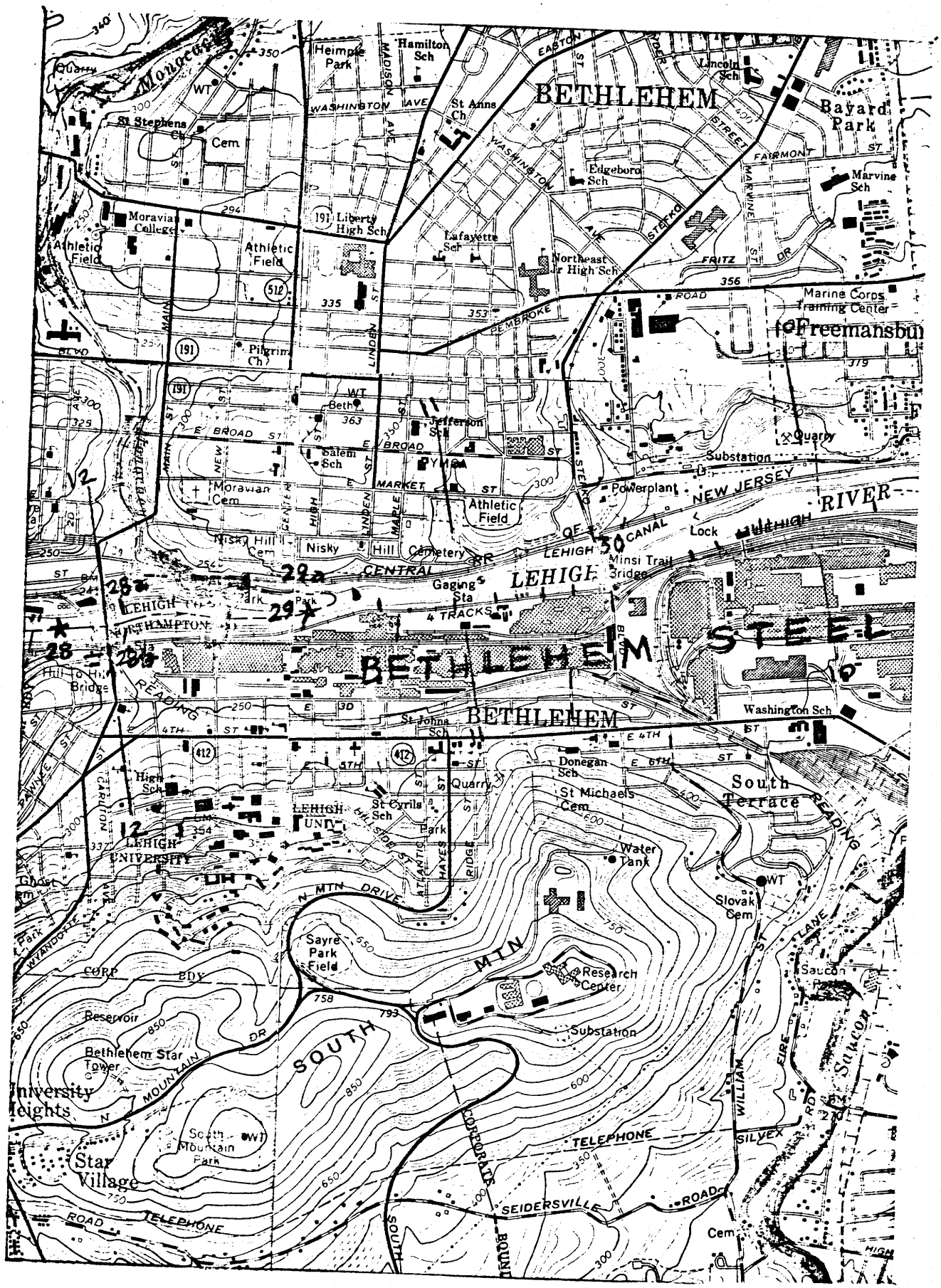


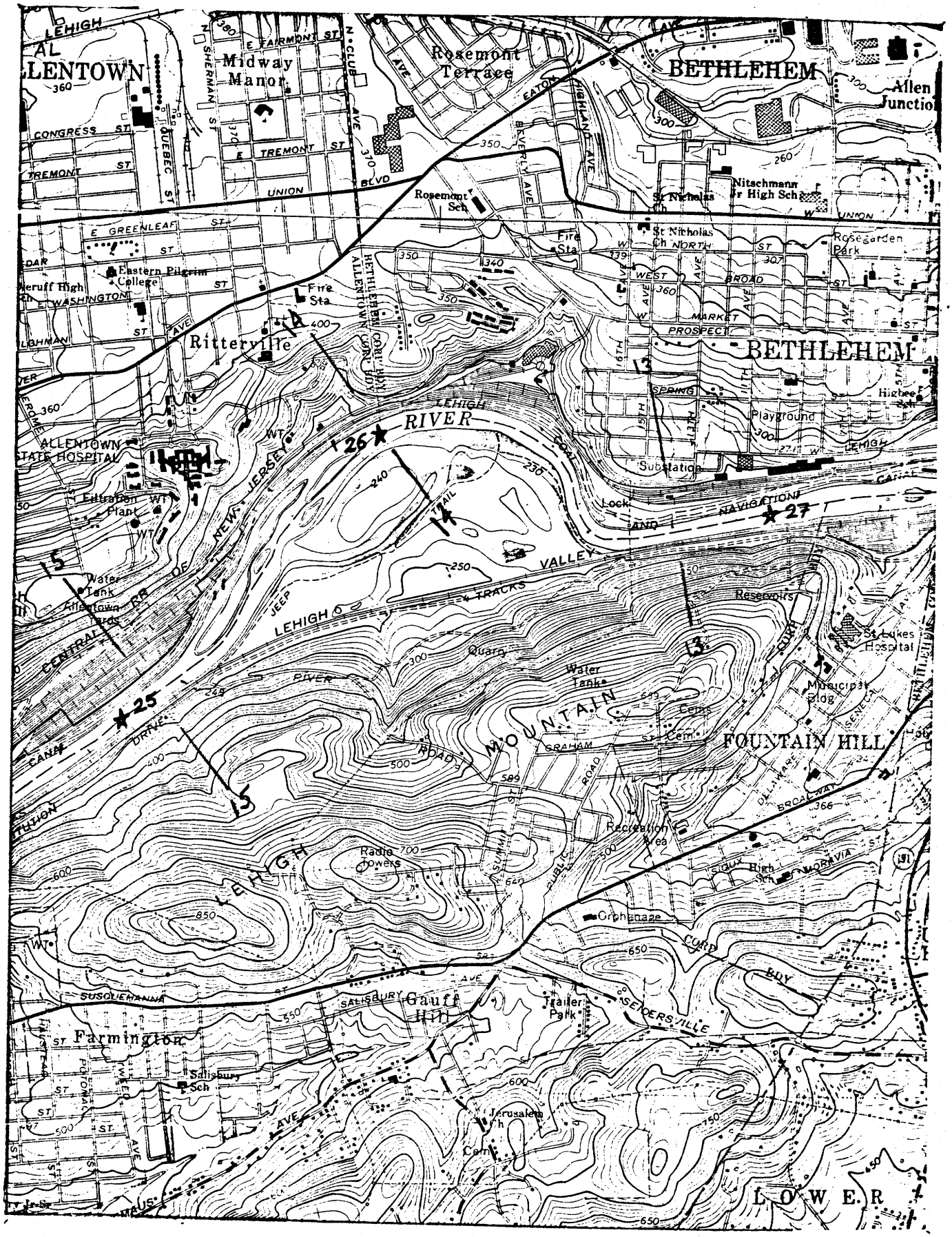
LEHIGH RIVER: MILE 6.7 to 9.7



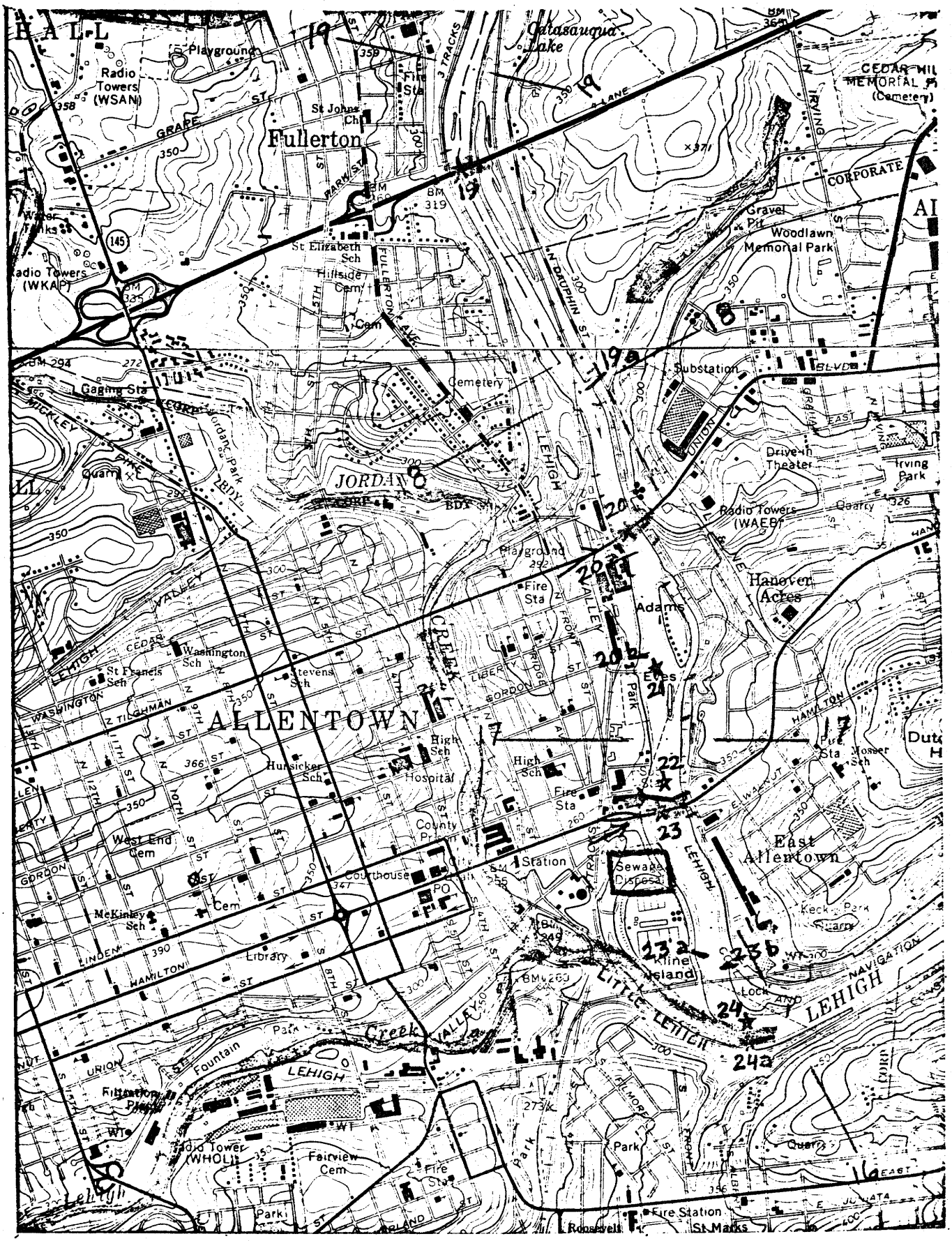
LEHIGH RIVER: MILE 9.7 to 12.2

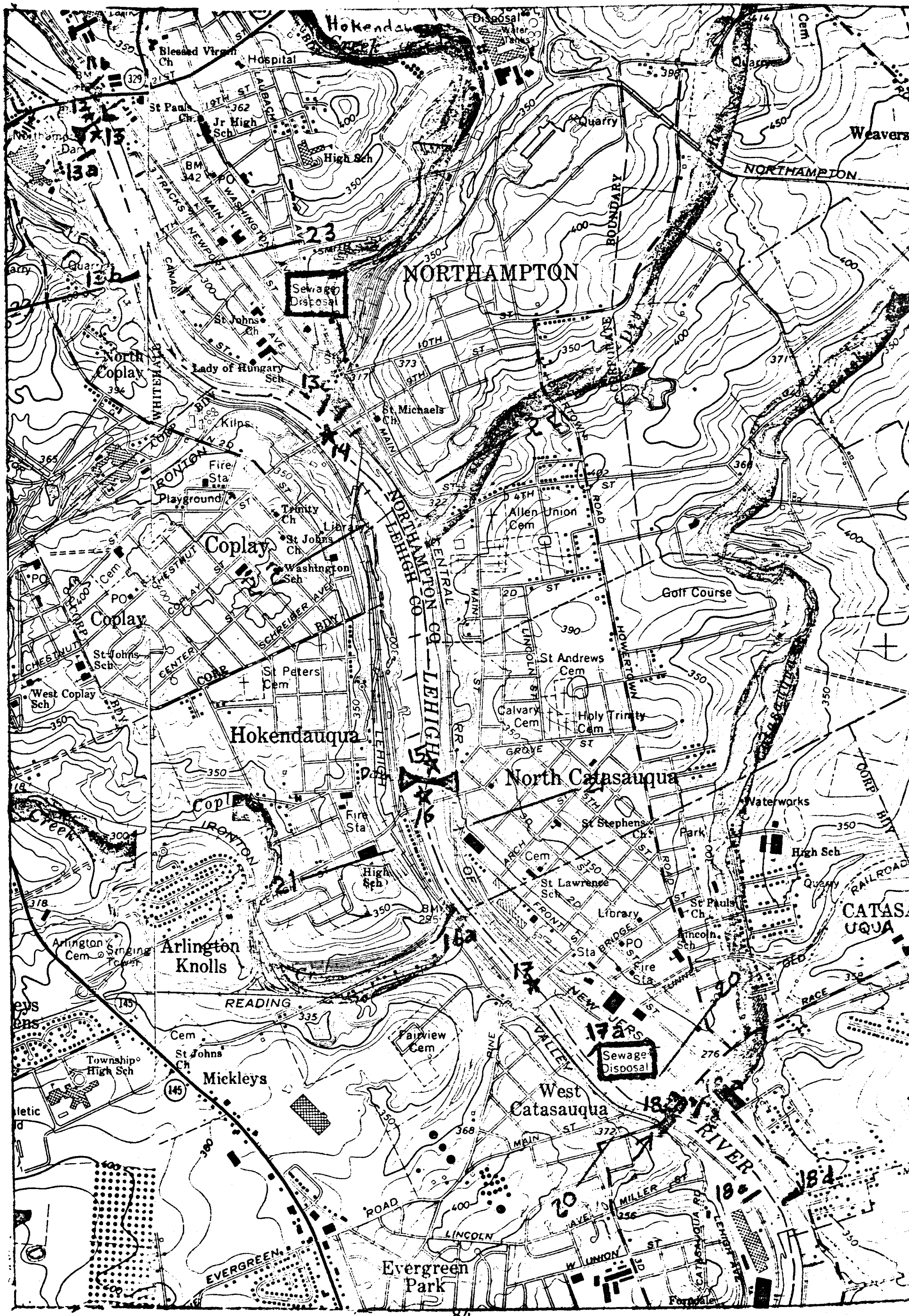


LEHIGH RIVER: MILE 12.2 to 15.5

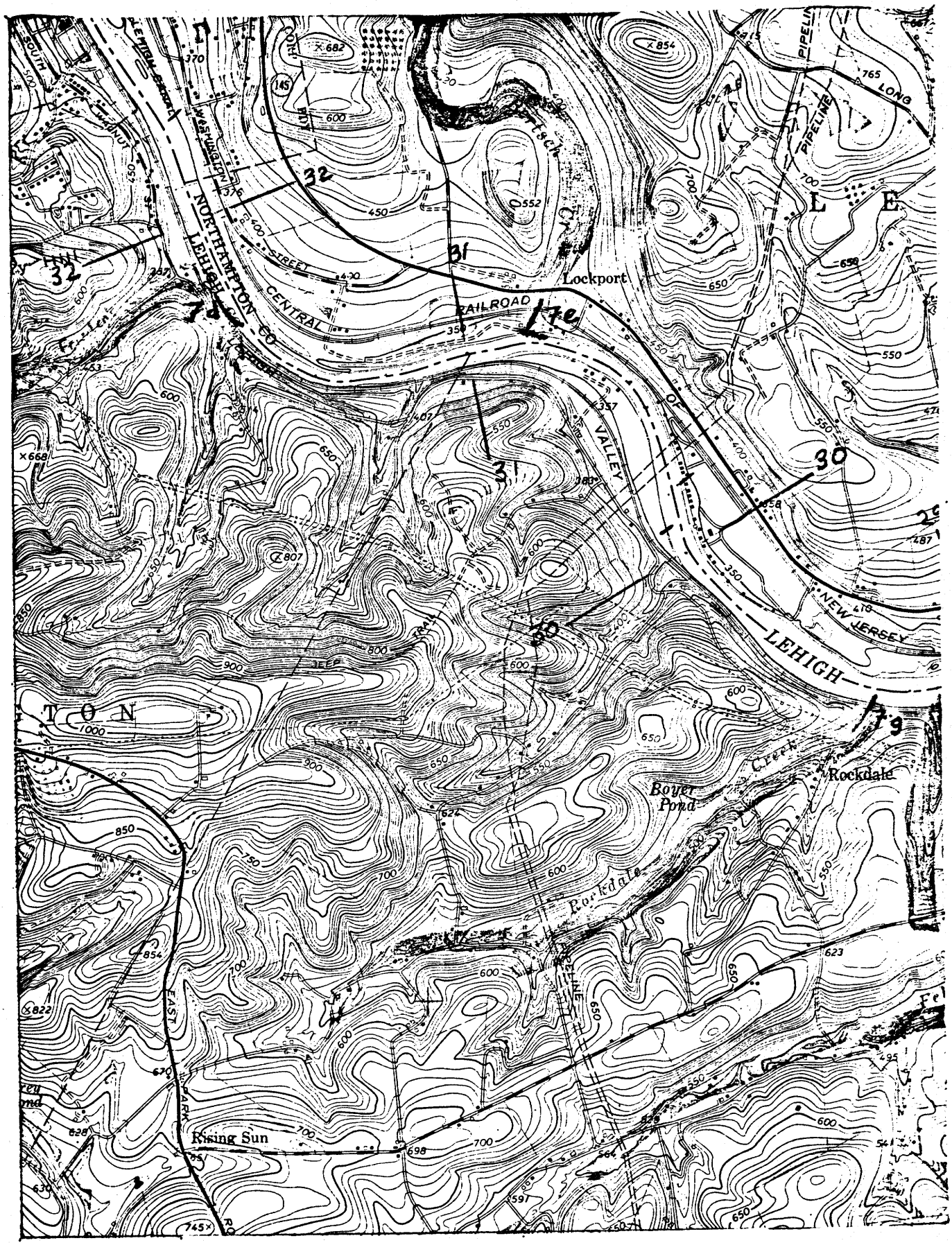


LEHIGH RIVER: MILE 15.5 to 19.2




NORTHAMPTON
Blessed Virgin Ch
Hospital
St Pauls Ch
Jr High Sch
High Sch
Sewage Disposal
St Johns Ch
Lady of Hungary Sch
St Michaels Ch
Quarry
Disposal
Water Tanks
Weavers
North Coplay
Kilns
Fire Sta
Playground
Trinity Ch
St Johns Ch
Washington Sch
Coplay
PO
Cem
St Johns Sch
West Coplay Sch
St Peters Cem
Hokendauqua
Fire Sta
High Sch
Allen Union Cem
Golf Course
St Andrews Cem
Calvary Cem
Holy Trinity Cem
North Catasauqua
St Stephens Ch
Park
Waterworks
High Sch
St Lawrence Sch
Library
St Pauls Ch
Lincoln Sch
PO
Sta
Fire Sta
CATASAUQUA
Arlington Cem
Singing Tower
Arlington Knolls
Fairview Cem
Cem
St Johns Ch
Township High Sch
Mickleys
West Catasauqua
Sewage Disposal
Evergreen Park
Fountain
NORTHAMPTON CO
LEHIGH CO
LEHIGH
RIVER
READING
EVERGREEN
LINCOLN
MILLER
W UNION
ROAD
CENTRAL RR
BOUNDARY
HOWERTOWN ROAD
IRONTON
MAIN
NEW JERSEY
VALLEY
Dam


H I G H
Treichlers
CHERRYVILLE
CENTRAL
RAILROAD
Mary Immaculate Missionary College
Athletic Field
ROAD
Twin Lakes
BM 338
A L L E N
Treichlers Dam
LEHIGH
STREET
CHURCH
Laurys Station
Spring Pond
Old Lauro Dam
St Johns Ch
Fell's Creek
NEW JERSEY
RIVER
Substation
Powerplant
VALLEY
SPRUCE
ROAD
LEWIS
Filtration Plant
Clean Spring Pond
NORTHAMPTON
LEHIGH CO
ROOSEVELT
Cementon Reservoir
SPRING
CREEK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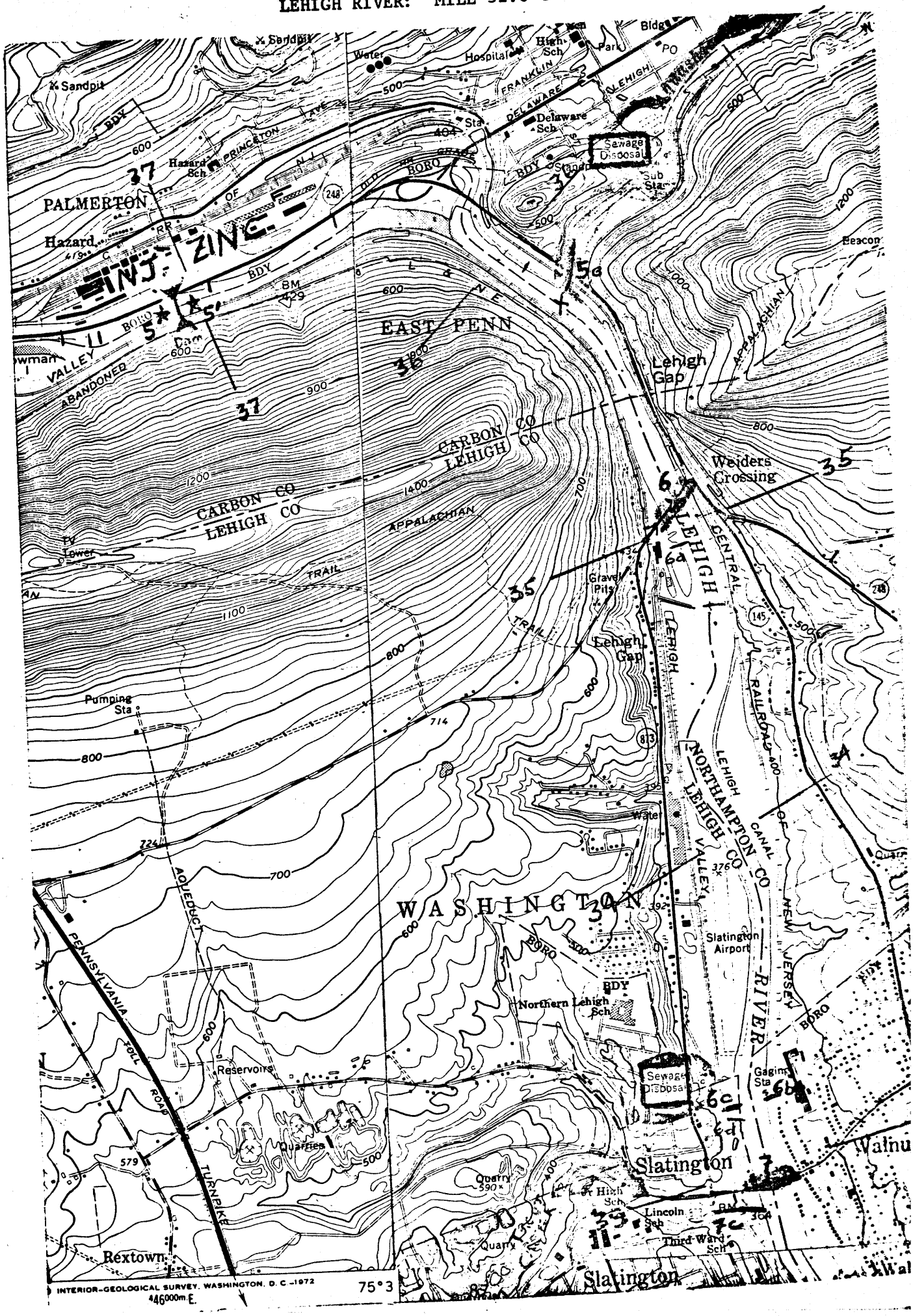
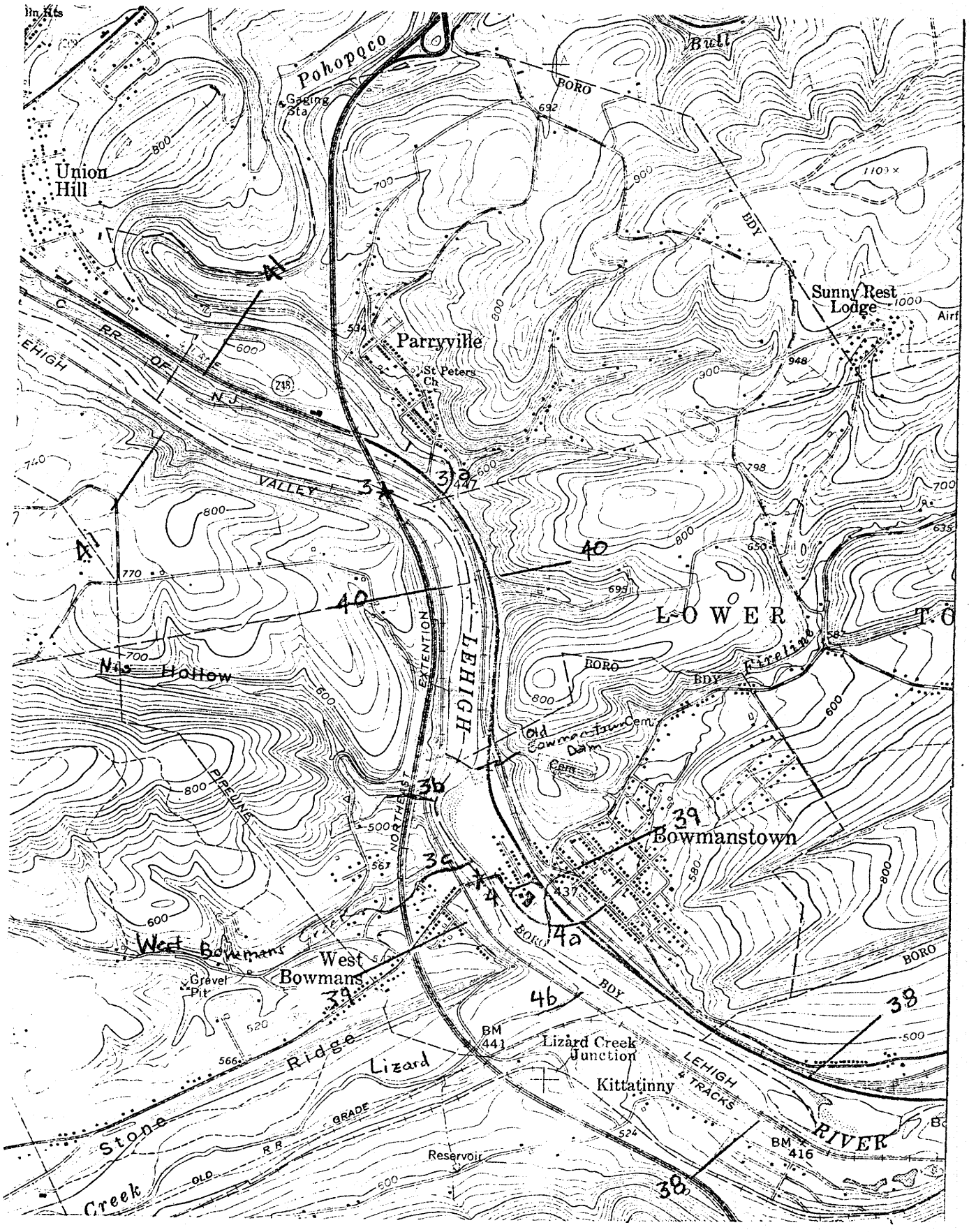
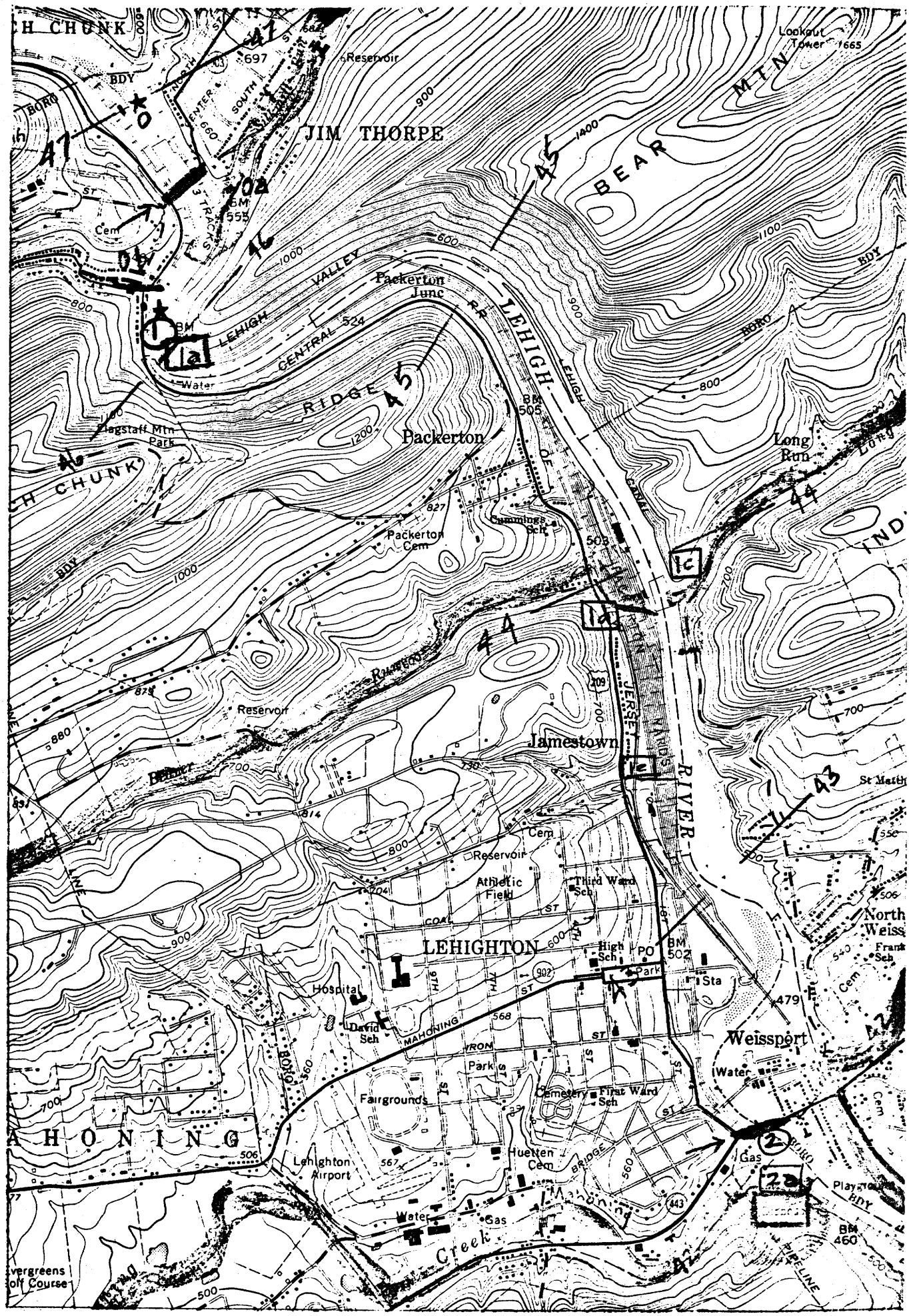
LONG
WEAVERTOWN
STREET
CHESTNUT
SOUTH
EAST
PARK
TRAIL
JEEP
Portsch Cr
Creek
Rockdale
31
32
30
29
T O N
L E

LEHIGH RIVER: MILE 32.6 to 37.4



LEHIGH RIVER: MILE 37.4 to 41.6

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BEAR MTN
Reservoir
697
BDY
BORO
CENTER
SOUTH
3 TRACKS
BM 555
Cem
LEHIGH VALLEY RR
Packerton Junc
LEHIGH CENTRAL 524
Water
RIDGE
Flagstaff Mtn Park
Packerton
BM 505
LEHIGH
Long Run
Packerton Cem
827
Cummings Sch
503
Reservoir
Jamestown
RIVER
JERSEY
209
Reservoir
Cem
Athletic Field
Third Ward Sch
LEHIGHTON
High Sch
PO
BM 502
Park
Sta
Hospital
David Sch
MAHONING
IRON
Weissport
Water
Fairgrounds
Cemetery
First Ward Sch
Lehighton Airport
Huetten Cem
BRIDGE
Gas
Water
Gas
Mahoning Creek
Evergreens Golf Course
BM 460
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St Matth
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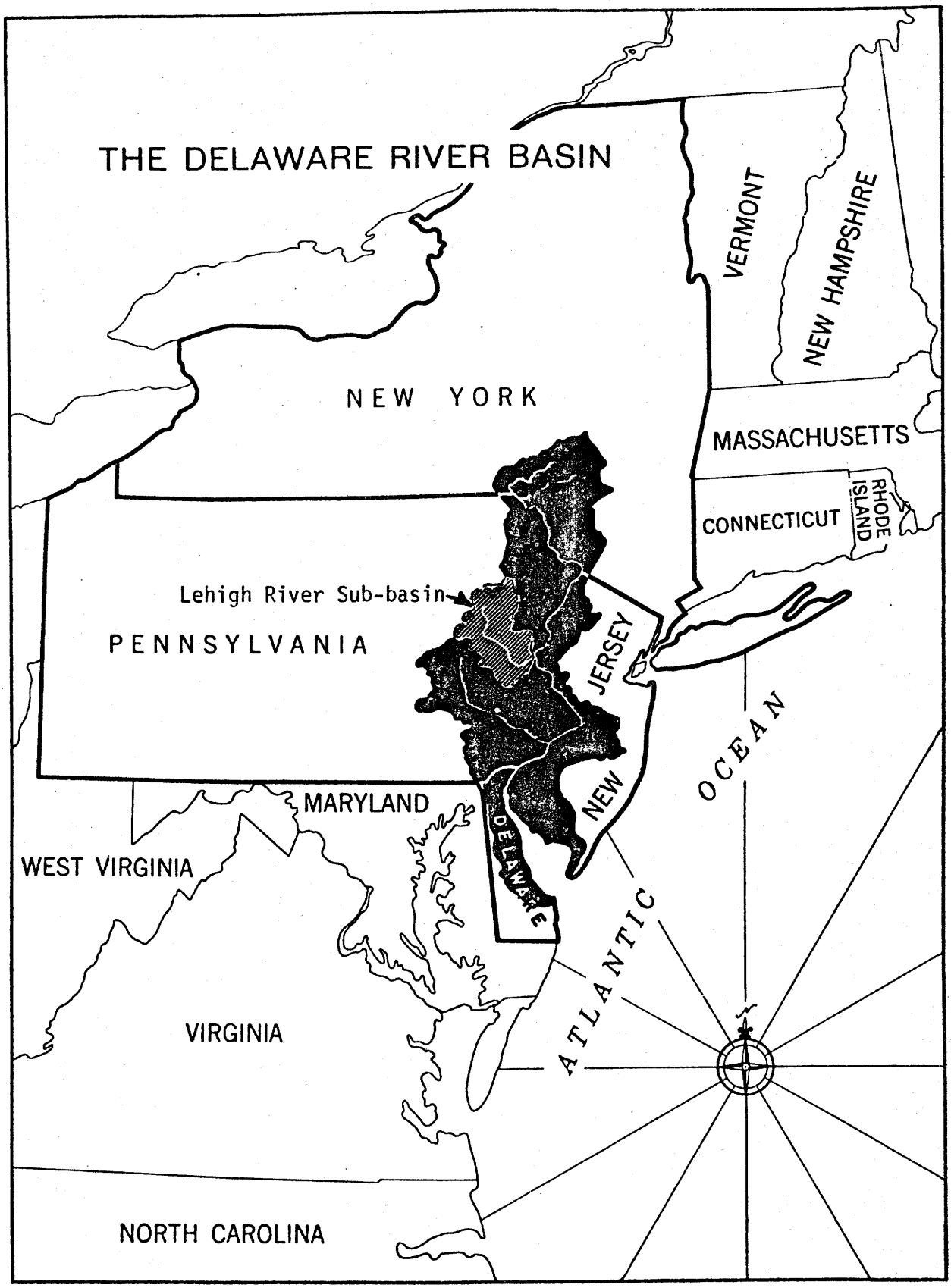
Cem
Play
1a
1c
2
2a

APPENDIX A

Maps


THE DELAWARE RIVER BASIN
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RHODE ISLAND
CONNECTICUT
Lehigh River Sub-basin
PENNSYLVANIA
NEW JERSEY
OCEAN
MARYLAND
DELAWARE
WEST VIRGINIA
ATLANTIC
VIRGINIA
NORTH CAROLINA

APPENDIX B

1974

Lehigh River Water Quality Data

Intakes

River Stations 1 through 41

Tributaries and Outfalls - Stations 1a through 39a

Abbreviations:

l.b. = left bank
r.b. = right bank

INTAKES

Station	River Mile	Intake Flow (cfs)
Northampton Co. Bureau of Water	24.7	2.4
Bethlehem Steel #A	10.9	68.6
Bethlehem Steel #B	10.2	137.2

NJ Zinc Intake on Pohopoco

STATION: (1) Lehigh River at Jim Thorpe$_2$
River Mile: 46.2
Description: River at train station before the rapids

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/23	8/9	AVG
	TIME		1030	1045			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft			130.0	144.0		---
DEPTH	ft		6.0	2.1	1.6		---
VELOCITY	fps			1.6	1.6		---
FLOW	cfs			443.8	371.6		400.4
TEMPERATURE	^oC		20.0		20.0	20.5	20.0
pH (lab)		6.90	6.40	6.50			6.6
TOTAL ALKALINITY	mg/ℓ	2	0	1.0			1.0
TOTAL HARDNESS	mg/ℓ	32	32	40			35
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8	8.8	9.0	9.7	9.1	9.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		6.5	0.2	6.9	1.0	1.0
TOTAL COLIFORM	#/100ml		640				640
FECAL COLIFORM	#/100ml		27				27
FECAL STREPTOCOCCUS	#/100ml		160				160
NITRITE (NO_2-N)	mg/ℓ	0.080	0.007	0.005			0.006
NITRATE (NO_3-N)	mg/ℓ	1.224	0.072	0.202			0.202
AMMONIA (NH_3-N)	mg/ℓ	0.530	0.406	0.336			0.424
KJELDAHL N. (TKN)	mg/ℓ		1.09				1.09
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	1.820	0.056	0.034			0.040
CHLORIDE	mg/ℓ			8.5			8.5
SULFATE	mg/ℓ			28.7			28.7
CALCIUM	mg/ℓ			7.4			7.4
MAGNESIUM	mg/ℓ			3.3			3.3
POTASSIUM	mg/ℓ			2.3			2.3
SODIUM	mg/ℓ			3.8			3.8

STATION: (2) River at Route 209 Bridge
River Mile: 41.8
Description: at Lehighton

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/25	8/12	AVG
	TIME		1210	1230	1245		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		2.5	1.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		21.5		19.0		20.0
pH (lab)		7.20	6.60	6.80			6.9
TOTAL ALKALINITY	mg/ℓ	1	3	2	1	2	2.0
TOTAL HARDNESS	mg/ℓ	28	32	38	38	64	40
DISSOLVED OXYGEN (DO)	mg/ℓ	11.6	8.8	8.9	9.9	9.9	9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.2	1.2	0.3	1.8	1.4	1.4
TOTAL COLIFORM	#/100ml		1200		900	1200	900
FECAL COLIFORM	#/100ml		100		400	100	250
FECAL STREPTOCOCCUS	#/100ml		490		8	15	490
NITRITE (NO_2-N)	mg/ℓ	0.006	0.040	0.034	0.006	0.004	0.005
NITRATE (NO_3-N)	mg/ℓ	0.252	0.202	0.101	0.259	0.135	0.190
AMMONIA (NH_3-N)	mg/ℓ	0.408	0.398	0.266	0.322	0.350	0.349
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.806	0.177	0.492
ORTHO PHOSPHATE	mg/ℓ	0.035	0.056	0.040	0.072	0.097	0.060
CHLORIDE	mg/ℓ			7.0			7.0
SULFATE	mg/ℓ			30.7			30.7
CALCIUM	mg/ℓ		7.5				7.5
MAGNESIUM	mg/ℓ		3.7				3.7
POTASSIUM	mg/ℓ		0.8				0.8
SODIUM	mg/ℓ		4.1				4.1

STATION: (3) River at N.E. Extension of Pa. Turnpike Bridge
River Mile: 40.6
Description: High Bridge

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/27	8/12	AVG
	TIME		1250	1320	1400		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		5.0	2.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		22.0		19.5		20.0
pH (lab)		6.95	6.75	7.20			7.0
TOTAL ALKALINITY	mg/ℓ	0	3	0	0		0
TOTAL HARDNESS	mg/ℓ	22	28	36	50		34
DISSOLVED OXYGEN (DO)	mg/ℓ	9.7	8.5	9.5	9.7		9.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.4	4.3	1.9	1.3		1.6
TOTAL COLIFORM	#/100ml				700		700
FECAL COLIFORM	#/100ml				100		100
FECAL STREPTOCOCCUS	#/100ml				45		45
NITRITE (NO_2-N)	mg/ℓ	0.006	0.049	0.032	0.010		0.030
NITRATE (NO_3-N)	mg/ℓ	0.328	0.115	0.151	0.270		0.216
AMMONIA (NH_3-N)	mg/ℓ	0.290	0.342	0.364	0.272		0.317
KJELDAHL N. (TKN)	mg/ℓ	2.11					2.11
TOTAL PHOSPHATE	mg/ℓ				0.338		0.338
ORTHO PHOSPHATE	mg/ℓ	0.050	0.032	0.040	0.064		0.046
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ			26.0			26.0
CALCIUM	mg/ℓ		7.1				7.1
MAGNESIUM	mg/ℓ		3.8				3.8
POTASSIUM	mg/ℓ		1.0				1.0
SODIUM	mg/ℓ		4.1				4.1

STATION: (4) River at Bowmanstown Bridge
River Mile: 39.1
Description:

Project LERMP: 1974	DATE	6/26	7/3	7/11	7/30	8/12	AVG
	TIME		1400	1400	1045		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		3	2.5			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	18.0	22.0		21.0		21.0
pH (lab)		7.65	7.45	6.50	7.00		7.2
TOTAL ALKALINITY	mg/ℓ	2	19	0	0	4	2.0
TOTAL HARDNESS	mg/ℓ	62	32	30	36	38	40
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2	9.0	9.3	8.6	9.8	9.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		1.4	0.8	2.5	1.3	1.5
TOTAL COLIFORM	#/100ml	4600			17,700	3200	3400
FECAL COLIFORM	#/100ml	46			1600	125	400
FECAL STREPTOCOCCUS	#/100ml				1700	20	140
NITRITE (NO_2-N)	mg/ℓ	0.017	0.034	0.050	0.018	0.006	0.030
NITRATE (NO_3-N)	mg/ℓ	0.010	1.008	0.101	0.351	0.162	0.205
AMMONIA (NH_3-N)	mg/ℓ	0.407	0.476	0.364	0.644	0.680	0.514
KJELDAHL N. (TKN)	mg/ℓ	1.41					1.41
TOTAL PHOSPHATE	mg/ℓ				0.419	0.258	0.338
ORTHO PHOSPHATE	mg/ℓ	0.230	0.105	0.071	0.072	0.161	0.102
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ			24.0			24.0
CALCIUM	mg/ℓ		7.4				7.4
MAGNESIUM	mg/ℓ		3.6				3.6
POTASSIUM	mg/ℓ		0.4				0.4
SODIUM	mg/ℓ		4.1				4.1

STATION: (5) River Above Palmerton Dam
River Mile: 37.1
Description:

Project LERMP: 1974	DATE	6/26	7/3	7/11	7/30	8/12	AVG
	TIME		1535	1530	1230		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		3.0	3.5			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	17.5	23.0		23.0		23.0
pH (lab)		8.30		6.80	7.00		---
TOTAL ALKALINITY	mg/ℓ	0	3	6	4	8	4
TOTAL HARDNESS	mg/ℓ	34	24	18	36	42	31
DISSOLVED OXYGEN (DO)	mg/ℓ	7.4	8.6	9.1	8.1		8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	1.6		1.3		1.4
TOTAL COLIFORM	#/100ml		1200		14,900		1400
FECAL COLIFORM	#/100ml		118		1600		140
FECAL STREPTOCOCCUS	#/100ml		201		1700		100
NITRITE (NO_2-N)	mg/ℓ	0.001	0.009	0.004	0.020	0.119	0.008
NITRATE (NO_3-N)	mg/ℓ	0.266	0.317	0.151	0.405	2.324	0.285
AMMONIA (NH_3-N)	mg/ℓ	0.630	0.498	0.372	0.798	3.4	0.574
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.258	0.588	0.423
ORTHO PHOSPHATE	mg/ℓ	0.027	0.048	0.052	0.097	0.262	0.056
CHLORIDE	mg/ℓ			11.0			11.0
SULFATE	mg/ℓ			2.7			2.7
CALCIUM	mg/ℓ		5.1			11.2	5.1
MAGNESIUM	mg/ℓ		2.2			4.8	2.2
POTASSIUM	mg/ℓ		1.0			3.5	1.0
SODIUM	mg/ℓ		6.4			15.8	6.4

STATION: (5) River below Palmerton Dam
River Mile: 37.0
Description:

Project LERMP: 1974	DATE	6/26	7/3	7/11	7/30		AVG
	TIME		1550		1240		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	17.5	23.0		23.0		23.0
pH (lab)		7.65					7.6
TOTAL ALKALINITY	mg/ℓ	4					4
TOTAL HARDNESS	mg/ℓ	28					28
DISSOLVED OXYGEN (DO)	mg/ℓ	9.6	8.9	9.3	8.0		9.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	1.3	0.8	1.3		1.3
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.020					0.020
NITRATE (NO_3-N)	mg/ℓ	0.187					0.187
AMMONIA (NH_3-N)	mg/ℓ	0.420					0.420
KJELDAHL N. (TKN)	mg/ℓ	1.564					1.564
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.038					0.038
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (6) River at Weider's Crossing Bridge
River Mile: 35.1
Description: at Lehigh Gap; Palmerton

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/30	8/12	AVG
	TIME			0930			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						—
DEPTH	ft						—
VELOCITY	fps						—
FLOW	cfs					672	672
TEMPERATURE	°C					22.5	22.5
pH (lab)		7.15		7.40			7.3
TOTAL ALKALINITY	mg/ℓ	3		13		14	13
TOTAL HARDNESS	mg/ℓ	34		64		54	51
DISSOLVED OXYGEN (DO)	mg/ℓ	10.1		9.8		9.4	9.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.2		1.0		1.5	1.2
TOTAL COLIFORM	#/100ml					L.A.	—
FECAL COLIFORM	#/100ml					14	—
FECAL STREPTOCOCCUS	#/100ml					10	—
NITRITE (NO_2-N)	mg/ℓ	0.014		0.012		0.014	0.013
NITRATE (NO_3-N)	mg/ℓ	0.295		0.648		0.305	0.416
AMMONIA (NH_3-N)	mg/ℓ	0.390		0.336		0.476	0.401
KJELDAHL N. (TKN)	mg/ℓ	2.11					2.11
TOTAL PHOSPHATE	mg/ℓ					0.355	0.355
ORTHO PHOSPHATE	mg/ℓ	0.193		0.060		0.105	0.149
CHLORIDE	mg/ℓ			7.0			7.0
SULFATE	mg/ℓ			53.3			53.3
CALCIUM	mg/ℓ		13.9				13.9
MAGNESIUM	mg/ℓ		4.2				4.2
POTASSIUM	mg/ℓ		0.8				0.8
SODIUM	mg/ℓ		4.4				4.4

STATION: (7) River at Walnutport Bridge
River Mile: 33.0
Description:

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/30	8/12	AVG
	TIME				1415		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft				368.0		---
DEPTH	ft				1.2		---
VELOCITY	fps				2.6		---
FLOW	cfs				1149.0		---
TEMPERATURE	^{o}C				24.5	23.0	22.0
pH (lab)		7.75					7.8
TOTAL ALKALINITY	mg/ℓ	6			8	13	9
TOTAL HARDNESS	mg/ℓ	48			42	48	46
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8		9.3	6.3	9.9	9.7
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0		1.0	2.7	1.5	1.7
TOTAL COLIFORM	#/100ml	1400				100	700
FECAL COLIFORM	#/100ml					17	80
FECAL STREPTOCOCCUS	#/100ml					12	50
NITRITE (NO_2-N)	mg/ℓ	0.020			0.017	0.022	0.020
NITRATE (NO_3-N)	mg/ℓ	0.338			0.370	0.378	0.362
AMMONIA (NH_3-N)	mg/ℓ	0.705			0.792	1.344	0.947
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.368	0.368
ORTHO PHOSPHATE	mg/ℓ	0.090			0.584	0.185	0.384
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ			9.4			9.4
MAGNESIUM	mg/ℓ			3.5			3.5
POTASSIUM	mg/ℓ			1.4			1.4
SODIUM	mg/ℓ			7.0			7.0

STATION: (8) River Above Treichlers Dam
River Mile: 28.5
Description:

Project LERMP: 1974	DATE	6/26		7/12	7/31		AVG
	TIME				1300		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C				23.5		23.5
pH (lab)					7.40		7.4
TOTAL ALKALINITY	mg/ℓ				6		6
TOTAL HARDNESS	mg/ℓ				40		40
DISSOLVED OXYGEN (DO)	mg/ℓ	9.4			8.8	8.4	8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.2			2.4	1.7	2.1
TOTAL COLIFORM	#/100ml				5900		650
FECAL COLIFORM	#/100ml				1400		70
FECAL STREPTOCOCCUS	#/100ml				70		60
NITRITE (NO_2-N)	mg/ℓ				0.020		0.020
NITRATE (NO_3-N)	mg/ℓ				0.378		0.378
AMMONIA (NH_3-N)	mg/ℓ				0.759		0.759
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ				0.717		0.717
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (9) River Below Treichlers Dam
River Mile: 28.4
Description:

Project LERMP: 1974	DATE	6/26		7/12	7/31		AVG
	TIME				1315		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C				23.5		23.5
pH (lab)		7.00		7.20			7.1
TOTAL ALKALINITY	mg/ℓ	8		6			7
TOTAL HARDNESS	mg/ℓ	38		22			30
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8		9.3	8.8	8.1	9.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.7		1.3	LA	0.8	0.9
TOTAL COLIFORM	#/100ml	3500					---
FECAL COLIFORM	#/100ml	70					---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.006		0.004			0.005
NITRATE (NO_3-N)	mg/ℓ	0.281		0.360			0.320
AMMONIA (NH_3-N)	mg/ℓ	0.660		0.364			0.512
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.128		0.043			0.128
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			32.7			32.7
CALCIUM	mg/ℓ			9.3			9.3
MAGNESIUM	mg/ℓ			3.7			3.7
POTASSIUM	mg/ℓ			1.0			1.0
SODIUM	mg/ℓ			5.7			5.7

STATION: (10) River at Laury's Station
River Mile: 26.1
Description:

Project LERMP: 1974	DATE	6/26		7/12	7/31	8/12	AVG
	TIME				1400		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			330	1185	593	703
TEMPERATURE	°C	19.0			24.0	22.5	23.5
pH (lab)				7.73	8.00		8.3
TOTAL ALKALINITY	mg/ℓ			10	6	9	8
TOTAL HARDNESS	mg/ℓ			40	36	44	40
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2		9.4	9.5	9.7	9.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.3		1.2	LA	1.5	1.3
TOTAL COLIFORM	#/100ml					2000	2000
FECAL COLIFORM	#/100ml					56	56
FECAL STREPTOCOCCUS	#/100ml					58	58
NITRITE (NO_2-N)	mg/ℓ	q		0.006	0.015	0.009	0.010
NITRATE (NO_3-N)	mg/ℓ			0.346	0.405	0.314	0.355
AMMONIA (NH_3-N)	mg/ℓ			0.420	0.588	0.280	0.429
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.093	0.093
ORTHO PHOSPHATE	mg/ℓ			0.047	1.209	0.306	0.306
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			29.3			29.3
CALCIUM	mg/ℓ			10.1			10.1
MAGNESIUM	mg/ℓ			3.9			3.9
POTASSIUM	mg/ℓ			1.4			1.4
SODIUM	mg/ℓ			5.4			5.4

STATION: (12) River Above Northampton Dam
River Mile: 23.5
Description:

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6		AVG
	TIME			1010	0930		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft			9.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	20.0		23.0	22.0		22.5
pH (lab)				7.3			7.3
TOTAL ALKALINITY	mg/ℓ			10.0			10.0
TOTAL HARDNESS	mg/ℓ			42			42
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2		8.6	8.5		8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.5		3.1	1.7		2.4
TOTAL COLIFORM	#/100ml			90			90
FECAL COLIFORM	#/100ml			31			31
FECAL STREPTOCOCCUS	#/100ml			22			22
NITRITE (NO_2-N)	mg/ℓ			0.006			0.006
NITRATE (NO_3-N)	mg/ℓ			0.131			0.131
AMMONIA (NH_3-N)	mg/ℓ			0.252			0.252
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ			0.074			0.074
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			32.0			32.0
CALCIUM	mg/ℓ			11.1			11.1
MAGNESIUM	mg/ℓ			3.9			3.9
POTASSIUM	mg/ℓ			0.8			0.8
SODIUM	mg/ℓ			6.0			6.0

STATION: (13) River below Northampton Dam
River Mile: 23.4
Description:

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		0950	1020	0935		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft			145.0			---
DEPTH	ft		2.5	1.3	4.0		---
VELOCITY	fps			1.8			---
FLOW	cfs			335.1			---
TEMPERATURE	^{o}C		26.0	23.0	22.0		22.5
pH (lab)		6.80	7.25	7.30	7.80		7.3
TOTAL ALKALINITY	mg/ℓ	7	11			17	12
TOTAL HARDNESS	mg/ℓ	36	40			80	52
DISSOLVED OXYGEN (DO)	mg/ℓ	9.6	8.8	8.4	8.9	9.3	8.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	0.6	1.6	1.3	2.8	1.5
TOTAL COLIFORM	#/100ml		550		3100	1400	3100
FECAL COLIFORM	#/100ml		30		500	416	500
FECAL STREPTOCOCCUS	#/100ml		70		120	62	120
NITRITE (NO_2-N)	mg/ℓ	0.006	0.003			0.013	0.007
NITRATE (NO_3-N)	mg/ℓ	0.461	0.377			0.189	0.342
AMMONIA (NH_3-N)	mg/ℓ	1.740	0.322			1.036	1.388
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.338	0.338
ORTHO PHOSPHATE	mg/ℓ	0.048	0.024			0.443	0.036
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ			10.2			10.2
MAGNESIUM	mg/ℓ			4.2			4.2
POTASSIUM	mg/ℓ			1.6			1.6
SODIUM	mg/ℓ			3.8			3.8

STATION: (14) River under 9th Street Bridge
River Mile: 22.3
Description: Railroad Overpass

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1105	1135	1030		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		4.0	6.5	7.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		26.0	24.0	22.5		23.0
pH (lab)				7.48	7.70		7.6
TOTAL ALKALINITY	mg/ℓ		10	13		16	13
TOTAL HARDNESS	mg/ℓ		44	52		56	51
DISSOLVED OXYGEN (DO)	mg/ℓ	9.6	8.5	8.8	9.1	9.3	8.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	∿0	0.3	1.8	1.5	1.4	1.3
TOTAL COLIFORM	#/100ml		650	250		1900	1900
FECAL COLIFORM	#/100ml		80	156		230	230
FECAL STREPTOCOCCUS	#/100ml		100	36		30	30
NITRITE (NO_2-N)	mg/ℓ		0.023	0.008		0.009	0.009
NITRATE (NO_3-N)	mg/ℓ		0.576	2.520		0.216	0.396
AMMONIA (NH_3-N)	mg/ℓ		0.294	0.218		0.504	0.339
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.193	0.193
ORTHO PHOSPHATE	mg/ℓ		0.037	0.089		0.141	0.089
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			38.7			38.7
CALCIUM	mg/ℓ		12.2				12.2
MAGNESIUM	mg/ℓ		4.5				4.5
POTASSIUM	mg/ℓ		0.9				0.9
SODIUM	mg/ℓ		6.1				6.1

STATION: (15) River above Hockendaqua Dam
River Mile: 21.2
Description:

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1135	1205	1100		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		7.5	7.0	7.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C		25.5	24.5	23.0		23.5
pH (lab)			7.13	7.30	8.20		7.5
TOTAL ALKALINITY	mg/ℓ		5	17		14	12
TOTAL HARDNESS	mg/ℓ		56	56		60	57
DISSOLVED OXYGEN (DO)	mg/ℓ	9.4	8.4	8.0	8.9	8.9	8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	~0	0.9	1.5	1.9	1.5	1.5
TOTAL COLIFORM	#/100ml		550	150	970	510	970
FECAL COLIFORM	#/100ml		27	71	230	460	190
FECAL STREPTOCOCCUS	#/100ml		20	11	890	10	25
NITRITE (NO_2-N)	mg/ℓ		0.260	0.010		0.009	0.010
NITRATE (NO_3-N)	mg/ℓ		0.439	0.504		0.189	0.377
AMMONIA (NH_3-N)	mg/ℓ		0.378	0.364		0.294	0.345
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.161	0.161
ORTHO PHOSPHATE	mg/ℓ		0.314	0.060		0.145	0.230
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			41.3			41.3
CALCIUM	mg/ℓ			12.8			12.8
MAGNESIUM	mg/ℓ			5.2			5.2
POTASSIUM	mg/ℓ			1.1			1.1
SODIUM	mg/ℓ			6.1			6.1

STATION: (16) Below Hockendaqua Dam
River Mile: 21.1
Description: before North Catasaqua Bridge

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1210	1245	1140		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		14.0	14.0	15.5		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		25.0	24.5	23.0		23.5
pH (lab)		7.20					7.2
TOTAL ALKALINITY	mg/ℓ	12					12
TOTAL HARDNESS	mg/ℓ	46					46
DISSOLVED OXYGEN (DO)	mg/ℓ	10.0	8.9	8.4	9.3	9.3	9.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.5	0.2	1.9	1.6	2.1	1.5
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.017					0.017
NITRATE (NO_3-N)	mg/ℓ	0.648					0.648
AMMONIA (NH_3-N)	mg/ℓ	0.360					0.360
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.220					0.220
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (17) Catasaqua Bridge
River Mile: 20.5
Description: Pine Street

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1245	1315	1200		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		1.5	1.5	2.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C		25.0	25.0	23.0		24.0
pH (lab)			7.78	7.85	7.80		7.8
TOTAL ALKALINITY	mg/ℓ		15	20		18	18
TOTAL HARDNESS	mg/ℓ		48	64		60	57
DISSOLVED OXYGEN (DO)	mg/ℓ	8.9	9.0	8.6	9.3	9.7	9.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	∿0	0.7	1.6	1.3	1.8	1.4
TOTAL COLIFORM	#/100ml				1380		1380
FECAL COLIFORM	#/100ml				180		180
FECAL STREPTOCOCCUS	#/100ml				24		24
NITRITE (NO_2-N)	mg/ℓ		0.045	0.040		0.007	0.031
NITRATE (NO_3-N)	mg/ℓ		0.475	0.533		0.216	0.408
AMMONIA (NH_3-N)	mg/ℓ		0.330	0.280		0.308	0.306
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.158	0.158
ORTHO PHOSPHATE	mg/ℓ		0.072	0.060		0.153	0.095
CHLORIDE	mg/ℓ			8.0			8.0
SULFATE	mg/ℓ			42.7			42.7
CALCIUM	mg/ℓ		14.2				14.2
MAGNESIUM	mg/ℓ		4.8				4.8
POTASSIUM	mg/ℓ		1.6				1.6
SODIUM	mg/ℓ		6.6				6.6

STATION: (18) River at Race Street Bridge
River Mile: 19.9
Description:

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1255	1330	1210		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						—
DEPTH	ft		3.5	3.0	3.5		—
VELOCITY	fps						—
FLOW	cfs						—
TEMPERATURE	°C		25.0	24.5	23.0		24.0
pH (lab)				8.1	8.0		8.0
TOTAL ALKALINITY	mg/ℓ			28			28
TOTAL HARDNESS	mg/ℓ			84			84
DISSOLVED OXYGEN (DO)	mg/ℓ	10.7	9.2	9.3	9.5	9.8	9.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.4	0.8	2.4	1.7	2.2	1.7
TOTAL COLIFORM	#/100ml		730	5600	7400		3000
FECAL COLIFORM	#/100ml		70	3050	290		290
FECAL STREPTOCOCCUS	#/100ml		50	350	110		110
NITRITE (NO_2-N)	mg/ℓ			0.030			0.030
NITRATE (NO_3-N)	mg/ℓ			0.778			0.778
AMMONIA (NH_3-N)	mg/ℓ			0.336			0.336
KJELDAHL N. (TKN)	mg/ℓ						—
TOTAL PHOSPHATE	mg/ℓ						—
ORTHO PHOSPHATE	mg/ℓ			0.141			0.141
CHLORIDE	mg/ℓ			9.0			9.0
SULFATE	mg/ℓ			42.6			42.6
CALCIUM	mg/ℓ		16.2				16.2
MAGNESIUM	mg/ℓ		5.8				5.8
POTASSIUM	mg/ℓ		1.8				1.8
SODIUM	mg/ℓ		7.0				7.0

STATION: (19) River at Rt. 22 Bridge
River Mile: 18.8
Description:

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1340	1435	1250		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						----
DEPTH	ft		6.0		5.0		----
VELOCITY	fps						----
FLOW	cfs						----
TEMPERATURE	°C		25.0	25.5	23.0		24.0
pH (lab)		7.30	7.82	8.60	8.00		7.9
TOTAL ALKALINITY	mg/ℓ	18	22	33			24
TOTAL HARDNESS	mg/ℓ	56	52	76			61
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2	9.0	10.1	9.4	10.5	9.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.8	0.5	2.3	1.7	4.1	1.9
TOTAL COLIFORM	#/100ml				1300	2300	1800
FECAL COLIFORM	#/100ml				240	300	270
FECAL STREPTOCOCCUS	#/100ml				34	28	34
NITRITE (NO_2-N)	mg/ℓ	0.006	0.020	0.022			0.021
NITRATE (NO_3-N)	mg/ℓ	0.864	0.634	0.972			0.823
AMMONIA (NH_3-N)	mg/ℓ	0.390	0.406	0.224			0.340
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.058	0.081	0.089			0.076
CHLORIDE	mg/ℓ			10.0			10.0
SULFATE	mg/ℓ			43.3			43.3
CALCIUM	mg/ℓ			18.9			18.9
MAGNESIUM	mg/ℓ			6.3			6.3
POTASSIUM	mg/ℓ			1.7			1.7
SODIUM	mg/ℓ			8.1			8.1

STATION: (20) River at Tilghman Street Bridge
River Mile: 17.6
Description:

Project LERMP: 1974	DATE	6/27	7/8	7/15	8/6	8/14	AVG
	TIME		1030	1520	1315		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		10.0	10.0	7.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		24.0	26.0	23.0		24.0
pH (lab)				8.70	8.10		8.4
TOTAL ALKALINITY	mg/ℓ			35			35
TOTAL HARDNESS	mg/ℓ			60			60
DISSOLVED OXYGEN (DO)	mg/ℓ		7.2	10.6	9.6	10.2	9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		0.3	2.3	1.5	2.7	2.2
TOTAL COLIFORM	#/100ml		1000				1000
FECAL COLIFORM	#/100ml		180				180
FECAL STREPTOCOCCUS	#/100ml		34				34
NITRITE (NO_2-N)	mg/ℓ			0.016			0.016
NITRATE (NO_3-N)	mg/ℓ			1.008			1.008
AMMONIA (NH_3-N)	mg/ℓ			0.210			0.210
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ			0.097			0.097
CHLORIDE	mg/ℓ			10.0			10.0
SULFATE	mg/ℓ			42.7			42.7
CALCIUM	mg/ℓ			18.2			18.2
MAGNESIUM	mg/ℓ			7.1			7.1
POTASSIUM	mg/ℓ			1.5			1.5
SODIUM	mg/ℓ			7.7			7.7

STATION: (21) River at Bucky Boyle Park
River Mile: 17.2
Description:

Project LERMP: 1974	DATE	6/27	7/8	7/15			AVG
	TIME			1550			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft			5.5			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C			26.0			26.0
pH (lab)				8.30			8.30
TOTAL ALKALINITY	mg/ℓ			36			36
TOTAL HARDNESS	mg/ℓ			100			100
DISSOLVED OXYGEN (DO)	mg/ℓ			9.4			9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ			1.9			1.9
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.018			0.018
NITRATE (NO_3-N)	mg/ℓ			0.878			0.878
AMMONIA (NH_3-N)	mg/ℓ			0.210			0.210
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ			0.080			0.080
CHLORIDE	mg/ℓ			11.0			11.0
SULFATE	mg/ℓ			48.0			48.0
CALCIUM	mg/ℓ			16.9			16.9
MAGNESIUM	mg/ℓ			7.1			7.1
POTASSIUM	mg/ℓ			1.4			1.4
SODIUM	mg/ℓ			11.0			11.0

STATION: (22) River above Hamilton Street Dam
River Mile: 16.9
Description:

Project LERMP: 1974	DATE	6/28	7/8	7/16	8/6	8/14	AVG
	TIME			1000	1330		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft			9.5	10.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C		25.0	23.0	23.5		24.0
pH (lab)		6.95		7.30	8.20		7.5
TOTAL ALKALINITY	mg/ℓ	89		34			62
TOTAL HARDNESS	mg/ℓ	176		86			131
DISSOLVED OXYGEN (DO)	mg/ℓ	9.5	7.6	7.2	9.4	9.6	8.7
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		1.0	2.4	1.5	3.6	2.1
TOTAL COLIFORM	#/100ml				570		570
FECAL COLIFORM	#/100ml				240		240
FECAL STREPTOCOCCUS	#/100ml				78		78
NITRITE (NO_2-N)	mg/ℓ	0.052		0.013			0.032
NITRATE (NO_3-N)	mg/ℓ	3.600		0.792			0.792
AMMONIA (NH_3-N)	mg/ℓ	0.560		0.896			0.728
KJELDAHL N. (TKN)	mg/ℓ	1.64					1.64
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.056		0.064			0.060
CHLORIDE	mg/ℓ			10.0			10.0
SULFATE	mg/ℓ			41.3			41.3
CALCIUM	mg/ℓ			19.9			19.9
MAGNESIUM	mg/ℓ			6.6			6.6
POTASSIUM	mg/ℓ			1.1			1.1
SODIUM	mg/ℓ			7.7			7.7

STATION: (23) River below Hamilton Street Dam
River Mile: 16.8
Description:

Project LERMP: 1974	DATE	6/28	7/8	7/16	8/7		AVG
	TIME			1020			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft		335.0	325.0			---
DEPTH	ft		2.2	2.0			---
VELOCITY	fps		1.1	0.9			---
FLOW	cfs		798.1	576.8			---
TEMPERATURE	^{o}C		25.0	23.0			24.0
pH (lab)		7.15					7.2
TOTAL ALKALINITY	mg/ℓ	24		34			29
TOTAL HARDNESS	mg/ℓ	60		104			82
DISSOLVED OXYGEN (DO)	mg/ℓ	9.0	8.2	8.0	10.1		8.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		1.0	2.9	8.2		2.0
TOTAL COLIFORM	#/100ml			3700			3700
FECAL COLIFORM	#/100ml			67			67
FECAL STREPTOCOCCUS	#/100ml			48			48
NITRITE (NO_2-N)	mg/ℓ	0.053		0.012			0.032
NITRATE (NO_3-N)	mg/ℓ	0.893		0.590			0.742
AMMONIA (NH_3-N)	mg/ℓ	0.470		0.868			0.669
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.056		0.072			0.068
CHLORIDE	mg/ℓ			10.5			10.5
SULFATE	mg/ℓ			39.3			39.3
CALCIUM	mg/ℓ			19.9			19.9
MAGNESIUM	mg/ℓ			6.8			6.8
POTASSIUM	mg/ℓ			1.1			1.1
SODIUM	mg/ℓ			7.3			7.3

STATION: (24) River below Kline's Island
River Mile: 16.1
Description:

Project LERMP: 1974	DATE	7/1	7/8	7/16	8/7	8/15	AVG
	TIME	0930			0935		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	9.0					
VELOCITY	fps						---
FLOW	cfs		810	585		997	797
TEMPERATURE	^{o}C	20					24.0
pH (lab)		7.60					7.6
TOTAL ALKALINITY	mg/ℓ	39			50		45
TOTAL HARDNESS	mg/ℓ	192			170		181
DISSOLVED OXYGEN (DO)	mg/ℓ	9.2					9.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.9					2.9
TOTAL COLIFORM	#/100ml			1100			---
FECAL COLIFORM	#/100ml			230			---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.062			0.043		0.052
NITRATE (NO_3-N)	mg/ℓ	2.016			0.512		0.512
AMMONIA (NH_3-N)	mg/ℓ	0.980			0.870		0.925
KJELDAHL N. (TKN)	mg/ℓ	1.96					---
TOTAL PHOSPHATE	mg/ℓ				0.378		0.378
ORTHO PHOSPHATE	mg/ℓ	0.250			0.296		0.273
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (25) River at Dutch Hill Water Tank
River Mile: 15.1
Description:

Project LERMP: 1974	DATE	7/1	7/8	7/16	8/7	8/15	AVG
	TIME			1115			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	8.5		3.5			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	20.0		24.0	22.0	23.0	23.0
pH (lab)		7.40		7.70	7.40		7.5
TOTAL ALKALINITY	mg/ℓ	38		58	46		47
TOTAL HARDNESS	mg/ℓ	74		104	80		86
DISSOLVED OXYGEN (DO)	mg/ℓ	9.2	9.2		7.4	7.8	7.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	5.2	5.2		4.0	4.3	4.2
TOTAL COLIFORM	#/100ml		420		13,000		3600
FECAL COLIFORM	#/100ml		160		1,360		800
FECAL STREPTOCOCCUS	#/100ml		78		750		600
NITRITE (NO_2-N)	mg/ℓ	0.055		0.168	0.055		0.093
NITRATE (NO_3-N)	mg/ℓ	0.662		1.008	0.311		0.660
AMMONIA (NH_3-N)	mg/ℓ	1.344		2.072	1.764		1.727
KJELDAHL N. (TKN)	mg/ℓ						3.63
TOTAL PHOSPHATE	mg/ℓ				0.403		0.403
ORTHO PHOSPHATE	mg/ℓ	0.202		0.581	0.363		0.382
CHLORIDE	mg/ℓ			18.0			18.0
SULFATE	mg/ℓ			42.7			42.7
CALCIUM	mg/ℓ			23.0			23.0
MAGNESIUM	mg/ℓ			10.3			10.3
POTASSIUM	mg/ℓ			3.0			3.0
SODIUM	mg/ℓ			14.8			14.8

STATION: (26) River at Power Lines Crossing
River Mile: 14.0
Description:

Project LERMP: 1974	DATE	7/1	7/8	7/16	8/7	8/15	AVG
	TIME			1210			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	10.0		3.5			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	21.0		25.0	22.0	23.0	23.5
pH (lab)		7.30		6.80	7.5		7.2
TOTAL ALKALINITY	mg/ℓ	26		47	36		36
TOTAL HARDNESS	mg/ℓ	72		112	68		84
DISSOLVED OXYGEN (DO)	mg/ℓ	6.2	8.9		7.9	8.5	8.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.8	1.9		2.7	2.8	2.7
TOTAL COLIFORM	#/100ml		310		9,350		2,800
FECAL COLIFORM	#/100ml		64		1,190		600
FECAL STREPTOCOCCUS	#/100ml		25		880		500
NITRITE (NO_2-N)	mg/ℓ	0.046		0.188	0.0319		0.039
NITRATE (NO_3-N)	mg/ℓ	0.605		1.512	0.297		0.805
AMMONIA (NH_3-N)	mg/ℓ	0.812		1.680	1.260		1.251
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.210		0.210
ORTHO PHOSPHATE	mg/ℓ	0.117		0.435	0.218		0.257
CHLORIDE	mg/ℓ			16.5			16.5
SULFATE	mg/ℓ			43.3			43.3
CALCIUM	mg/ℓ			21.6			21.6
MAGNESIUM	mg/ℓ			9.9			9.9
POTASSIUM	mg/ℓ			2.0			2.0
SODIUM	mg/ℓ			13.9			13.9

STATION: (27) River at Old Bethlehem Fabricators
River Mile: 12.8
Description:

Project LERMP: 1974	DATE	7/1					AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps	5.5					---
FLOW	cfs						---
TEMPERATURE	^{o}C	21.0					21.0
pH (lab)		7.50					7.5
TOTAL ALKALINITY	mg/ℓ	28					28
TOTAL HARDNESS	mg/ℓ	64					64
DISSOLVED OXYGEN (DO)	mg/ℓ	8.3					8.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.7					2.7
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.034					0.034
NITRATE (NO_3-N)	mg/ℓ	0.504					0.504
AMMONIA (NH_3-N)	mg/ℓ	0.462					0.462
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.081					0.081
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (28) River at Surefit
River Mile: 12.1
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7	8/15	AVG
	TIME		1000	1320			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft		4.75				---
DEPTH	ft	8.0					---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	21.0		24.5	22.5	23.0	23.5
pH (lab)		7.40	7.95		7.5		7.5
TOTAL ALKALINITY	mg/ℓ	43	45		41		43
TOTAL HARDNESS	mg/ℓ	84	84		84		84
DISSOLVED OXYGEN (DO)	mg/ℓ	9.3		9.9	8.1	8.7	9.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.5		3.0	3.0	6.9	3.2
TOTAL COLIFORM	#/100ml		410		5500		2000
FECAL COLIFORM	#/100ml		140		530		530
FECAL STREPTOCOCCUS	#/100ml		18		17		400
NITRITE (NO_2-N)	mg/ℓ	0.043	0.082		0.0352		0.053
NITRATE (NO_3-N)	mg/ℓ	1.296	0.746		0.405		0.816
AMMONIA (NH_3-N)	mg/ℓ	0.700	1.036		1.065		0.933
KJELDAHL N. (TKN)	mg/ℓ	0.12					0.12
TOTAL PHOSPHATE	mg/ℓ				0.58		0.58
ORTHO PHOSPHATE	mg/ℓ	0.210	0.331		0.282		0.274
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				19.5		19.5
MAGNESIUM	mg/ℓ				11.0		11.0
POTASSIUM	mg/ℓ				3.5		3.5
SODIUM	mg/ℓ				7.2		7.2

STATION: (29) River at Monocacy Creek
River Mile: 11.5
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME				1250		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		5.0		7.5		---
VELOCITY	fps						---
FLOW	cfs				950		950
TEMPERATURE	^{o}C	22.0			23.0	23.5	23.0
pH (lab)		7.10	7.90				7.5
TOTAL ALKALINITY	mg/ℓ	34	47		43	50	44
TOTAL HARDNESS	mg/ℓ	74	94		74	94	84
DISSOLVED OXYGEN (DO)	mg/ℓ	8.6			8.4	8.9	8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.9			3.1	4.1	3.6
TOTAL COLIFORM	#/100ml		340			6100	---
FECAL COLIFORM	#/100ml		110			770	---
FECAL STREPTOCOCCUS	#/100ml		33			69	---
NITRITE (NO_2-N)	mg/ℓ	0.063	0.009		0.051	0.081	0.065
NITRATE (NO_3-N)	mg/ℓ	2.376	1.166		0.311	0.405	0.627
AMMONIA (NH_3-N)	mg/ℓ	0.910	0.554		1.148	1.148	0.938
KJELDAHL N. (TKN)	mg/ℓ		1.40				1.40
TOTAL PHOSPHATE	mg/ℓ				0.661	0.516	0.588
ORTHO PHOSPHATE	mg/ℓ	0.202	0.258		0.330	0.435	0.306
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (30) River at Minsi Trail Bridge
River Mile: 10.6
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME		1300	1135	1355		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	9.0	8.0	5.0	9.8		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	22.0		24.0	24.5	25.0	24.5
pH (lab)		7.40	8.10	7.70			7.7
TOTAL ALKALINITY	mg/ℓ	40	48	69	44		50
TOTAL HARDNESS	mg/ℓ	86	96	124	120		106
DISSOLVED OXYGEN (DO)	mg/ℓ	8.0		8.3	7.4	8.5	8.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.0		2.7	2.5	3.2	2.8
TOTAL COLIFORM	#/100ml	10,300		6100	8800	11,000	6100
FECAL COLIFORM	#/100ml	770		390	1400	450	770
FECAL STREPTOCOCCUS	#/100ml	230		62	200	58	200
NITRITE (NO_2-N)	mg/ℓ	0.075	0.200	0.450	0.308		0.319
NITRATE (NO_3-N)	mg/ℓ	2.160	1.368	2.088	0.351		1.872
AMMONIA (NH_3-N)	mg/ℓ	1.162	1.288	1.204	0.812		1.116
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.306		0.306
ORTHO PHOSPHATE	mg/ℓ	0.181	0.347	0.484	0.298		0.328
CHLORIDE	mg/ℓ			27.0			27.0
SULFATE	mg/ℓ			62.0			62.0
CALCIUM	mg/ℓ			20.4			20.4
MAGNESIUM	mg/ℓ			17.4			17.4
POTASSIUM	mg/ℓ			4.3			4.3
SODIUM	mg/ℓ			11.6			11.6

STATION: (31) River above Saucon Creek
River Mile: 9.5
Description: Below Beth Steel effluents

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME			1230	1535		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft			5.0	10.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	22.5		26.0	25.0	28.0	26.0
pH (lab)		7.28		7.80			7.5
TOTAL ALKALINITY	mg/ℓ	40		45	46	58	47
TOTAL HARDNESS	mg/ℓ	80		132	80	108	100
DISSOLVED OXYGEN (DO)	mg/ℓ			8.8	7.6	5.9	7.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ			3.7	2.7	2.0	2.8
TOTAL COLIFORM	#/100ml					1200	5200
FECAL COLIFORM	#/100ml					875	600
FECAL STREPTOCOCCUS	#/100ml					140	140
NITRITE (NO_2-N)	mg/ℓ	0.080		0.270	0.066	0.114	0.133
NITRATE (NO_3-N)	mg/ℓ	1.584		0.274	0.324	0.460	0.353
AMMONIA (NH_3-N)	mg/ℓ	1.134		0.952	1.176	1.288	1.138
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.467	0.467	0.467
ORTHO PHOSPHATE	mg/ℓ	0.157		0.468	0.477	0.330	0.358
CHLORIDE	mg/ℓ			9.0			9.0
SULFATE	mg/ℓ			100.0			100.0
CALCIUM	mg/ℓ			22.9			22.9
MAGNESIUM	mg/ℓ			19.4			19.4
POTASSIUM	mg/ℓ			6.5			6.5
SODIUM	mg/ℓ			29.6			29.6

STATION: (32) River at Freemansburg Bridge
River Mile: 9.2
Description: At Rt. 412

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	
	TIME		1340	1330			
MEASUREMENT	UNITS	1	2	3	4	5	AVG
WIDTH	ft						---
DEPTH	ft		10.0	8.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C	23.0		26.0	25.0	26.5	26.0
pH (lab)		6.70	8.22	7.90			7.6
TOTAL ALKALINITY	mg/ℓ	0	48	18		58	31
TOTAL HARDNESS	mg/ℓ	94	106	140		116	114
DISSOLVED OXYGEN (DO)	mg/ℓ			8.2	7.7	7.9	7.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.6		2.5	3.2	6.2	4.0
TOTAL COLIFORM	#/100ml	2800				5800	4000
FECAL COLIFORM	#/100ml	350				150	350
FECAL STREPTOCOCCUS	#/100ml	360				4	360
NITRITE (NO_2-N)	mg/ℓ	0.029	0.550	0.196		0.140	0.295
NITRATE (NO_3-N)	mg/ℓ	3.384	1.764	1.620		0.392	2.256
AMMONIA (NH_3-N)	mg/ℓ	4.620	3.430	2.100		4.200	3.588
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					1.161	1.161
ORTHO PHOSPHATE	mg/ℓ	0.230	0.331	0.492		0.532	0.396
CHLORIDE	mg/ℓ			22.5			22.5
SULFATE	mg/ℓ			47.7			47.7
CALCIUM	mg/ℓ			26.3			26.3
MAGNESIUM	mg/ℓ			12.8			12.8
POTASSIUM	mg/ℓ			5.4			5.4
SODIUM	mg/ℓ			14.8			14.8

STATION: (33) River below Steel City Island
River Mile: 8.4
Description: 1000' below

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C	23.0				26.5	26.0
pH (lab)		7.05					7.05
TOTAL ALKALINITY	mg/ℓ	0					0
TOTAL HARDNESS	mg/ℓ	88					88
DISSOLVED OXYGEN (DO)	mg/ℓ	8.0				7.3	7.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.1				3.2	3.2
TOTAL COLIFORM	#/100ml	8100					8100
FECAL COLIFORM	#/100ml	750					750
FECAL STREPTOCOCCUS	#/100ml	62					62
NITRITE (NO_2-N)	mg/ℓ	0.027					0.027
NITRATE (NO_3-N)	mg/ℓ	3.240					3.240
AMMONIA (NH_3-N)	mg/ℓ	3.500					3.500
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.250					0.250
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (34) River under Power Lines at Lower Saucon
River Mile: 7.3
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/19	AVG
	TIME			1430			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		5.0	6.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	24.5		26.0	25.0	26.5	26.0
pH (lab)		6.70		7.80			7.2
TOTAL ALKALINITY	mg/ℓ	0	53	68		66	47
TOTAL HARDNESS	mg/ℓ	94	110	136		120	115
DISSOLVED OXYGEN (DO)	mg/ℓ	7.7		7.3	6.3	6.9	7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.4		4.2	2.9	4.7	3.8
TOTAL COLIFORM	#/100ml	9300					3600
FECAL COLIFORM	#/100ml	900					400
FECAL STREPTOCOCCUS	#/100ml	64					73
NITRITE (NO_2-N)	mg/ℓ	0.021	0.005	0.720		0.242	0.481
NITRATE (NO_3-N)	mg/ℓ	2.160	2.088	2.772		0.508	2.340
AMMONIA (NH_3-N)	mg/ℓ	1.400	2.380	3.640		3.080	2.625
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.629	0.629
ORTHO PHOSPHATE	mg/ℓ	0.343	0.379	0.516		0.649	0.472
CHLORIDE	mg/ℓ			24.5			24.5
SULFATE	mg/ℓ			60.0			60.0
CALCIUM	mg/ℓ			20.9			20.9
MAGNESIUM	mg/ℓ			15.5			15.5
POTASSIUM	mg/ℓ			5.4			5.4
SODIUM	mg/ℓ			13.8			13.8

STATION: (35) River at Bethlehem Boating Club
River Mile: 5.7
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/15	AVG
	TIME	1105	1030	1030	1015		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	9.5	6.5	5.5	8.5		---
VELOCITY	fps						---
FLOW	cfs			543	700	513	1045
TEMPERATURE	°C	22.0		26.0	25.0	26.5	26.0
pH (lab)		7.10	7.42	7.80			7.6
TOTAL ALKALINITY	mg/ℓ	38	56	82	60	68	59
TOTAL HARDNESS	mg/ℓ	84	110	136	100	126	108
DISSOLVED OXYGEN (DO)	mg/ℓ	7.6	4.7	4.4	4.2	6.3	5.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.9	7.0	2.2	5.0	3.8	4.6
TOTAL COLIFORM	#/100ml	2000				17,700	2000
FECAL COLIFORM	#/100ml					850	450
FECAL STREPTOCOCCUS	#/100ml					8	60
NITRITE (NO_2-N)	mg/ℓ	0.104	0.200	0.301	0.330	0.231	0.233
NITRATE (NO_3-N)	mg/ℓ	2.736	3.096	2.013	2.940	0.514	2.589
AMMONIA (NH_3-N)	mg/ℓ	1.400	3.080	3.234	0.513	3.500	3.150
KJELDAHL N. (TKN)	mg/ℓ	4.22					4.22
TOTAL PHOSPHATE	mg/ℓ					0.629	0.629
ORTHO PHOSPHATE	mg/ℓ	0.210	0.331	0.766	0.532	0.532	0.379
CHLORIDE	mg/ℓ			27.0			27.0
SULFATE	mg/ℓ			63.3			63.3
CALCIUM	mg/ℓ			23.4			23.4
MAGNESIUM	mg/ℓ			18.1			18.1
POTASSIUM	mg/ℓ			4.8			4.8
SODIUM	mg/ℓ			14.8			14.8

STATION: (36) River at Right Side of Large Island
River Mile: 5.0
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1110	945		1030		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	8.0	9.5	6.25	9.5		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C	22.0		26.0	25.5	25.5	26.0
pH (lab)		7.20	7.40	7.70			7.4
TOTAL ALKALINITY	mg/ℓ	37	56	80	59	66	60
TOTAL HARDNESS	mg/ℓ	80	116	142	110	112	112
DISSOLVED OXYGEN (DO)	mg/ℓ	5.8	4.0	4.7	3.9	4.0	4.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.2	7.1	2.5	>3.2	3.5	4.4
TOTAL COLIFORM	#/100ml	5000	200	5700			1800
FECAL COLIFORM	#/100ml		20	1400			640
FECAL STREPTOCOCCUS	#/100ml						80
NITRITE (NO_2-N)	mg/ℓ	0.127	0.390	0.324	0.319	0.297	0.291
NITRATE (NO_3-N)	mg/ℓ	3.456	2.952	2.520	0.351	0.427	2.976
AMMONIA (NH_3-N)	mg/ℓ	1.736	2.212	2.800	2.800	3.080	2.526
KJELDAHL N. (TKN)	mg/ℓ	4.54					4.54
TOTAL PHOSPHATE	mg/ℓ					0.661	0.661
ORTHO PHOSPHATE	mg/ℓ	0.185	0.411	0.734	0.596	0.540	0.493
CHLORIDE	mg/ℓ			24.0			24.0
SULFATE	mg/ℓ			60.7			60.7
CALCIUM	mg/ℓ			26.8			26.8
MAGNESIUM	mg/ℓ			18.1			18.1
POTASSIUM	mg/ℓ			4.8			4.8
SODIUM	mg/ℓ			11.7			11.7

STATION: (37) Above Glendon Dam
River Mile: 3.2
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1225	1130	1200	1130		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	7.0	13.0	9.5	11.5		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	^{o}C	~23		26.0	26.5	26.0	26.0
pH (lab)		7.30	7.10	7.90			7.4
TOTAL ALKALINITY	mg/ℓ	42	54	80	53		57
TOTAL HARDNESS	mg/ℓ	84	108	144	108		111
DISSOLVED OXYGEN (DO)	mg/ℓ	6.3	5.4	5.2	4.9	9.0	5.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.0	4.8	LA	2.8	6.7	4.6
TOTAL COLIFORM	#/100ml	11,000			2100	500	2100
FECAL COLIFORM	#/100ml				1200	30	530
FECAL STREPTOCOCCUS	#/100ml				27		27
NITRITE (NO_2-N)	mg/ℓ	0.132	0.430	0.352	0.308		0.306
NITRATE (NO_3-N)	mg/ℓ	2.736	2.844	2.448	0.378		2.676
AMMONIA (NH_3-N)	mg/ℓ	1.750	2.632	3.234	2.548		2.541
KJELDAHL N. (TKN)	mg/ℓ	4.54	23.02				4.54
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.218	0.371	0.685	0.443		0.429
CHLORIDE	mg/ℓ			26.5			26.5
SULFATE	mg/ℓ			56.7			56.7
CALCIUM	mg/ℓ			20.4			20.4
MAGNESIUM	mg/ℓ			18.1			18.1
POTASSIUM	mg/ℓ			5.4			5.4
SODIUM	mg/ℓ			12.9			12.9

STATION: (38) Below Glendon Dam
River Mile: 3.1
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1305	1250		1230		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft			279.0	223.0		---
DEPTH	ft	2.0	3.0	1.5	2.0		---
VELOCITY	fps			2.4	2.4		---
FLOW	cfs			1021.2	1054.2		---
TEMPERATURE	°C	25.0		26.0	26.5	26.5	26.5
pH (lab)		7.20	8.30				7.8
TOTAL ALKALINITY	mg/ℓ	40	54				47
TOTAL HARDNESS	mg/ℓ	44	104				74
DISSOLVED OXYGEN (DO)	mg/ℓ	7.9	7.5	7.2	7.3	7.6	7.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.5	3.7	LA	4.8	> 7.6	4.6
TOTAL COLIFORM	#/100ml	11,000					---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.130	0.076				0.103
NITRATE (NO_3-N)	mg/ℓ	2.304	2.736				2.520
AMMONIA (NH_3-N)	mg/ℓ	1.792	2.660				2.226
KJELDAHL N. (TKN)	mg/ℓ	5.47	36.10				5.47
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.210	0.332				0.271
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (39) River at Glendon Bridge
River Mile: 2.2
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1330	1305		1255		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	3.0	4.0	4.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C	~24		27.0	26.5	26.5	26.5
pH (lab)		7.35	7.50	8.00			7.6
TOTAL ALKALINITY	mg/ℓ	40	54	79	54	65	58
TOTAL HARDNESS	mg/ℓ	120	110	140	104	116	118
DISSOLVED OXYGEN (DO)	mg/ℓ	8.4	7.2	8.3	7.5	7.5	7.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	6.1	3.6	LA	4.9	2.9	4.4
TOTAL COLIFORM	#/100ml	3500					1800
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.132	0.050	0.375	0.319	0.286	0.278
NITRATE (NO_3-N)	mg/ℓ	2.736	2.880	2.736	0.405	0.454	2.784
AMMONIA (NH_3-N)	mg/ℓ	1.736	2.380	3.071	2.240	2.520	2.553
KJELDAHL N. (TKN)	mg/ℓ	5.00					5.00
TOTAL PHOSPHATE	mg/ℓ					0.580	0.580
ORTHO PHOSPHATE	mg/ℓ	0.238	0.331	0.694	0.484	0.548	0.459
CHLORIDE	mg/ℓ			25.0			25.0
SULFATE	mg/ℓ			57.3			57.3
CALCIUM	mg/ℓ			25.8			25.8
MAGNESIUM	mg/ℓ			19.0			19.0
POTASSIUM	mg/ℓ			5.4			5.4
SODIUM	mg/ℓ			13.4			13.4

STATION: (40) River at Train Trestle Bridge
River Mile: 0.9
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1415	1350		1345		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	9.0	8.0	6.0	7.0		---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C			27.0	27.0	26.5	27.0
pH (lab)		7.05	7.92	7.60			7.5
TOTAL ALKALINITY	mg/ℓ	37	52	77	53		55
TOTAL HARDNESS	mg/ℓ	200	106	146	106		140
DISSOLVED OXYGEN (DO)	mg/ℓ	7.9	8.0	8.6	8.1	6.9	7.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		2.8	LA	3.8	6.9	3.2
TOTAL COLIFORM	#/100ml	2600					---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.006	0.540	0.352	0.286		0.393
NITRATE (NO_3-N)	mg/ℓ	2.088	2.664	3.096	0.378		2.494
AMMONIA (NH_3-N)	mg/ℓ	1.456	1.624	3.071	2.128		2.070
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.250	1.492	0.677	0.516		0.734
CHLORIDE	mg/ℓ			27.0			27.0
SULFATE	mg/ℓ			56.0			56.0
CALCIUM	mg/ℓ			22.4			22.4
MAGNESIUM	mg/ℓ			17.7			17.7
POTASSIUM	mg/ℓ			5.4			5.4
SODIUM	mg/ℓ			15.8			15.8

STATION: (41) Above Easton Dam
River Mile: 0.06
Description:

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1440	1415		1400		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft	12.0	11.0	10.0			---
VELOCITY	fps						---
FLOW	cfs						---
TEMPERATURE	°C			26.0	27.0	26.5	26.5
pH (lab)		7.45	7.75	7.80			7.7
TOTAL ALKALINITY	mg/ℓ	41	55	86	55	68	61
TOTAL HARDNESS	mg/ℓ	80	98	140	102	118	108
DISSOLVED OXYGEN (DO)	mg/ℓ	7.9	8.5	8.7	7.4	7.5	8.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.2	3.5	3.9	3.6	8.8	4.6
TOTAL COLIFORM	#/100ml					400	1000
FECAL COLIFORM	#/100ml					230	230
FECAL STREPTOCOCCUS	#/100ml					60	60
NITRITE (NO_2-N)	mg/ℓ	0.152	3.168	0.259	0.264	0.341	0.254
NITRATE (NO_3-N)	mg/ℓ	2.880	0.190	3.325	0.432	0.432	1.452
AMMONIA (NH_3-N)	mg/ℓ	2.296	2.380	3.234	2.212	2.380	2.500
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.645	0.645
ORTHO PHOSPHATE	mg/ℓ	0.968	0.355	0.500	0.395	0.423	0.528
CHLORIDE	mg/ℓ			26.0			26.0
SULFATE	mg/ℓ			56.7			56.7
CALCIUM	mg/ℓ			22.9			22.9
MAGNESIUM	mg/ℓ			17.4			17.4
POTASSIUM	mg/ℓ			5.1			5.1
SODIUM	mg/ℓ			14.3			14.3

STATION: 1a Jim Thorpe Sewage Treatment Plant
River Mile: 46.0
Description: (1.b.) After Chlorination

Project LERMP: 1974	DATE				7/25	8/9	AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						1.0
TEMPERATURE	^{o}C				20	20.5	20.5
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ					141	141
TOTAL HARDNESS	mg/ℓ					44	44
DISSOLVED OXYGEN (DO)	mg/ℓ				0.5	0.4	0.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				>90	280	280.
TOTAL COLIFORM	#/100ml				104,000	840,000	450,000
FECAL COLIFORM	#/100ml				1200	320,000	160,000
FECAL STREPTOCOCCUS	#/100ml				12,600	260,000	135,000
NITRITE (NO_2-N)	mg/ℓ					0.097	0.097
NITRATE (NO_3-N)	mg/ℓ					2.622	2.622
AMMONIA (NH_3-N)	mg/ℓ					21.000	21.00
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					4.154	4.154
ORTHO PHOSPHATE	mg/ℓ					2.340	2.340
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				7.8		7.8
MAGNESIUM	mg/ℓ				3.9		3.9
POTASSIUM	mg/ℓ				4.0		4.0
SODIUM	mg/ℓ				265.4		265.4

STATION: 1b Lehigh Canal Outlet
River Mile: 44.0
Description: (1.b.) 150 Yd. before water main crossing the river

Project LERMP: 1974	DATE	6/24	7/3	7/11			AVG
	TIME		1125	1140			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		0.2				0.2
TEMPERATURE	^{o}C		23.0				23.0
pH (lab)		6.90	6.50	7.50			7.0
TOTAL ALKALINITY	mg/ℓ	3	1	2			2
TOTAL HARDNESS	mg/ℓ	48	24	34			35
DISSOLVED OXYGEN (DO)	mg/ℓ	8.0	8.2	8.3			8.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.8	2.0	0.5			2.0
TOTAL COLIFORM	#/100ml						100
FECAL COLIFORM	#/100ml						20
FECAL STREPTOCOCCUS	#/100ml						10
NITRITE (NO_2-N)	mg/ℓ	0.003	0.004	0.002			0.003
NITRATE (NO_3-N)	mg/ℓ	0.252	0.216	0.101			0.190
AMMONIA (NH_3-N)	mg/ℓ	0.200	0.375	0.356			0.310
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.128	0.056	0.032			0.044
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ			22.7			22.7
CALCIUM	mg/ℓ			7.4			7.4
MAGNESIUM	mg/ℓ			3.4			3.4
POTASSIUM	mg/ℓ			2.2			2.2
SODIUM	mg/ℓ			3.8			3.8

STATION: (1c) Long Run
River Mile: 44.1
Description: (1.b.) 100 yds after water main

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/25	8/12	AVG
	TIME		1130	1145	1330		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	4.0	5.0		7.0		---
DEPTH	ft	0.8	0.8		0.5		---
VELOCITY	fps	1.4	1.0		0.5		---
FLOW	cfs	3.0	3.0	0.1	2.1		2.55
TEMPERATURE	^{o}C	16.0	19.0		18.0		18.0
pH (lab)		7.60	6.70	7.30	---		7.2
TOTAL ALKALINITY	mg/ℓ	4	4	6	6	7	5
TOTAL HARDNESS	mg/ℓ	12	44	16	20	16	16
DISSOLVED OXYGEN (DO)	mg/ℓ	9.7	8.9	8.3	9.2	10.8	9.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	0.5	0.5	1.3	2.9	1.3
TOTAL COLIFORM	#/100ml				5100	36,000	6000
FECAL COLIFORM	#/100ml				460	12,800	1000
FECAL STREPTOCOCCUS	#/100ml				2100	2800	2500
NITRITE (NO_2-N)	mg/ℓ	0.0	0.006	0.002	0.012	0.010	0.006
NITRATE (NO_3-N)	mg/ℓ	0.187	0.288	0.139	0.230	0.149	0.199
AMMONIA (NH_3-N)	mg/ℓ		0.274	0.232	0.392	0.392	0.322
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.242	0.242
ORTHO PHOSPHATE	mg/ℓ	0.135	0.113	0.048	0.189	0.210	0.139
CHLORIDE	mg/ℓ			6.0			6.0
SULFATE	mg/ℓ			4.7			4.7
CALCIUM	mg/ℓ		4.1				4.1
MAGNESIUM	mg/ℓ		1.8				1.8
POTASSIUM	mg/ℓ		0.8				0.8
SODIUM	mg/ℓ		4.4				4.4

STATION: (1d) Beaver Run
River Mile: 44.1
Description: (r.b.) Under water main along straight stretch of river by Packerton Railroad Yards

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/26	8/9	AVG
	TIME				1045		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	3.0	4.5		4.5		---
DEPTH	ft	0.3	0.3		0.4		---
VELOCITY	fps	0.7	1.0		2.0		---
FLOW	cfs	0.3	1.1		0.8		0.83
TEMPERATURE	^{o}C				16.5	19.5	16.5
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ				6	11	8
TOTAL HARDNESS	mg/ℓ				14	20	17
DISSOLVED OXYGEN (DO)	mg/ℓ	9.3			8.6	9.2	8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.0			0.6	1.3	0.6
TOTAL COLIFORM	#/100ml				2500		2500
FECAL COLIFORM	#/100ml				160		160
FECAL STREPTOCOCCUS	#/100ml				1500		1500
NITRITE (NO_2-N)	mg/ℓ				0.014	0.012	0.013
NITRATE (NO_3-N)	mg/ℓ				0.243	0.378	0.310
AMMONIA (NH_3-N)	mg/ℓ				0.230	0.448	0.339
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.346	0.346
ORTHO PHOSPHATE	mg/ℓ				0.758	0.097	0.097
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				19.5		19.5
MAGNESIUM	mg/ℓ				12.9		12.9
POTASSIUM	mg/ℓ				4.3		4.3
SODIUM	mg/ℓ				8.7		8.7

STATION: 1e "La Stinka" Effluent
River Mile: 43.4
Description: (r.b.) Jamestown; at LVRR

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/25	8/9	AVG
	TIME		1140	1210	1100		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		0.03	0.01			0.03
TEMPERATURE	^{o}C		15.0		16.5	16.0	16.0
pH (lab)		7.10	7.00	7.00			7.0
TOTAL ALKALINITY	mg/ℓ	21	26	31	44	50	32
TOTAL HARDNESS	mg/ℓ	40	44	42	36	56	44
DISSOLVED OXYGEN (DO)	mg/ℓ	7.7	5.1	4.4		3.9	3.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>9.0	6.0	10.6	>33.2	16.0	16.0
TOTAL COLIFORM	#/100ml		147,000		1,040,000		147,000
FECAL COLIFORM	#/100ml				64,000		64,000
FECAL STREPTOCOCCUS	#/100ml		10,000		36,000		36,000
NITRITE (NO_2-N)	mg/ℓ	0.122	0.133	1.680	0.103	0.180	0.134
NITRATE (NO_3-N)	mg/ℓ	1.786	3.096	1.782	0.359	0.824	1.872
AMMONIA (NH_3-N)	mg/ℓ	1.804	2.156	4.760	6.020	7.84	3.654
KJELDAHL N. (TKN)	mg/ℓ		6.4				6.41
TOTAL PHOSPHATE	mg/ℓ					1.773	1.773
ORTHO PHOSPHATE	mg/ℓ	0.490	0.274	1.532	1.451	1.69	1.558
CHLORIDE	mg/ℓ			16.0			16.0
SULFATE	mg/ℓ			13.2			13.2
CALCIUM	mg/ℓ		8.4				8.4
MAGNESIUM	mg/ℓ		3.8				3.8
POTASSIUM	mg/ℓ		3.2				3.2
SODIUM	mg/ℓ		16.0				16.0

STATION: (2a) Mahoning Creek
River Mile: 42.1
Description: (r.b.) Muddy-looking

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/26	8/12	AVG
	TIME		1215	1245	1000		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	25.0	57.0	36.0	29.0		---
DEPTH	ft	1.0	0.5	0.6	0.3		---
VELOCITY	fps	1.0	0.7	1.0	1.0		---
FLOW	cfs	21.4	17.5	18.0	12.1		15.73
TEMPERATURE	^{o}C		21.0		20.0		20.0
pH (lab)		6.80	7.30	7.20			7.1
TOTAL ALKALINITY	mg/ℓ	8	9	6		32	8
TOTAL HARDNESS	mg/ℓ	26	60	42		30	33
DISSOLVED OXYGEN (DO)	mg/ℓ	9.0	8.4	7.0	8.3	8.3	8.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	> 9.0	> 9.0	> 16.0	> 35.2	16.0	16.0
TOTAL COLIFORM	#/100ml		6700		12,000	172,000	9000
FECAL COLIFORM	#/100ml		470		170	L.A.	170
FECAL STREPTOCOCCUS	#/100ml		630		20	21	21
NITRITE (NO_2-N)	mg/ℓ	0.035	0.238	2.600		0.021	0.028
NITRATE (NO_3-N)	mg/ℓ	0.792	1.800	0.778		0.324	0.631
AMMONIA (NH_3-N)	mg/ℓ	1.750	2.660	5.320		4.382	3.528
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.999	0.999
ORTHO PHOSPHATE	mg/ℓ	0.178	0.556	0.895		0.850	0.872
CHLORIDE	mg/ℓ			13.0			13.0
SULFATE	mg/ℓ			4.3			4.3
CALCIUM	mg/ℓ		5.3				5.3
MAGNESIUM	mg/ℓ		2.6				2.6
POTASSIUM	mg/ℓ		2.2				2.2
SODIUM	mg/ℓ		9.7				9.7

STATION: (3a) Pohopoco Creek
River Mile: 40.5
Description: (1.b.) along section of rapids

Project LERMP: 1974	DATE	6/24	7/3	7/11	7/25	8/12	AVG
	TIME		1300	1330			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	35.0	64.0	66.0	26.0		---
DEPTH	ft	1.0	1.0	1.0	1.2		---
VELOCITY	fps	1.0	1.1	1.1	1.5		---
FLOW	cfs	32.0	73.0	65.0	44.6		63.0
TEMPERATURE	^{o}C	16.0	17.0		17.0		17.0
pH (lab)			7.15	6.70			6.9
TOTAL ALKALINITY	mg/ℓ		6	8	7	8	7
TOTAL HARDNESS	mg/ℓ		24	22	20	22	22
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2	9.6	9.7	9.6	9.8	9.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	0	0.5	1.5	1.3	1.5
TOTAL COLIFORM	#/100ml				5000	7500	6200
FECAL COLIFORM	#/100ml				304	570	420
FECAL STREPTOCOCCUS	#/100ml				107	42	75
NITRITE (NO_2-N)	mg/ℓ		0.092	0.009	0.017	0.002	0.030
NITRATE (NO_3-N)	mg/ℓ		0.979	0.504	0.384	0.211	0.520
AMMONIA (NH_3-N)	mg/ℓ		0.210	0.336	0.336	0.252	0.284
KJELDAHL N. (TKN)	mg/ℓ		1.33				1.33
TOTAL PHOSPHATE	mg/ℓ				1.048	0.097	0.097
ORTHO PHOSPHATE	mg/ℓ		0.048	0.048	0.072	0.048	0.054
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			3.3			3.3
CALCIUM	mg/ℓ		4.7				4.7
MAGNESIUM	mg/ℓ		1.6				1.6
POTASSIUM	mg/ℓ		0.9				0.9
SODIUM	mg/ℓ		4.5				4.5

STATION: (3c) West Bowmans Creek
River Mile: 39.2
Description: (rb) 200 yds. upstream of Bowmanstown Bridge just below Nis Hollow

Project LERMP: 1974	DATE	6/24	7/3	7/11			AVG
	TIME		1350	1355			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	5.0					---
DEPTH	ft	0.33					---
VELOCITY	fps	0.25					
FLOW	cfs	0.42	0.1				0.3
TEMPERATURE	^{o}C	15.0	18.0				18.0
pH (lab)			7.15	6.70			6.9
TOTAL ALKALINITY	mg/ℓ		11	10			10
TOTAL HARDNESS	mg/ℓ		38	40			39
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8	8.8	6.7			8.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0	0				0.0
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ		0.032	0.080			0.056
NITRATE (NO_3-N)	mg/ℓ		1.008	0.785			0.896
AMMONIA (NH_3-N)	mg/ℓ		0.218	0.760			0.489
KJELDAHL N. (TKN)	mg/ℓ						----
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ		0.064	0.079			0.072
CHLORIDE	mg/ℓ			9.5			9.5
SULFATE	mg/ℓ			7.7			7.7
CALCIUM	mg/ℓ		4.7				4.7
MAGNESIUM	mg/ℓ		2.8				2.8
POTASSIUM	mg/ℓ		0.6				0.6
SODIUM	mg/ℓ		5.9				5.9

STATION: (4a) Fireline Creek
River Mile: 39.1
Description: (1.b.) Quiet Stretch

Project LERMP: 1974	DATE	6/26	7/3	7/11	7/30	8/12	AVG
	TIME		1400	1415	1100		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	4.0	6.0		9.0		---
DEPTH	ft	0.8	0.6		0.3		---
VELOCITY	fps	0.9	0.6		1.0		---
FLOW	cfs	2.1	2.1	1.9	2.6		1.9
TEMPERATURE	^{o}C	16.0	20.0		20.0		20.0
pH (lab)		7.20	7.00	6.90	7.45		7.1
TOTAL ALKALINITY	mg/ℓ	8	3	16	21		15
TOTAL HARDNESS	mg/ℓ	44	30	36	40		38
DISSOLVED OXYGEN (DO)	mg/ℓ	10.4	9.5	9.8	8.8		8.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.7	3.7	2.9	4.6		4.6
TOTAL COLIFORM	#/100ml				60,000		60,000
FECAL COLIFORM	#/100ml				45,000		45,000
FECAL STREPTOCOCCUS	#/100ml				5800		5800
NITRITE (NO_2-N)	mg/ℓ	0.041	0.209	0.010	0.020		0.024
NITRATE (NO_3-N)	mg/ℓ	0.418	0.020	0.634	0.514		0.522
AMMONIA (NH_3-N)	mg/ℓ	0.360	0.504	0.616	1.361		0.493
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				1.290		1.290
ORTHO PHOSPHATE	mg/ℓ	0.014	0.040	0.298	0.145		0.145
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ		5.7				5.7
MAGNESIUM	mg/ℓ		2.9				2.9
POTASSIUM	mg/ℓ		0.6				0.6
SODIUM	mg/ℓ		2.4				5.4

STATION: (4b) Lizard Creek
River Mile: 38.9
Description: (rb) Concrete arch bridge; muddy color

Project LERMP: 1974	DATE	6/25	7/3	7/11	7/30	8/12	AVG
	TIME		1430	1430	1015		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	12.0	60.0	34.0	58.0		---
DEPTH	ft	1.5	3.0	1.0	1.6		---
VELOCITY	fps	2.4		0.8	1.1		---
FLOW	cfs	40.0		25.8	99.4		31.2
TEMPERATURE	^{o}C	18.0	23.0		21.0		21.0
pH (lab)		7.30	8.00	7.60	7.80		7.7
TOTAL ALKALINITY	mg/ℓ	32	20	16	44	29	28
TOTAL HARDNESS	mg/ℓ	40	40	36	50	50	43
DISSOLVED OXYGEN (DO)	mg/ℓ	10.8	9.3	9.2	8.9	9.8	8.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.5	0.2	0.6	2.9	1.5	2.9
TOTAL COLIFORM	#/100ml				10,700	2300	2000
FECAL COLIFORM	#/100ml				3100	0	600
FECAL STREPTOCOCCUS	#/100ml				11,600	40	230
NITRITE (NO_2-N)	mg/ℓ	0.013	0.012	0.010	0.055	0.009	0.011
NITRATE (NO_3-N)	mg/ℓ	0.331	1.440	0.288	0.486	0.216	0.330
AMMONIA (NH_3-N)	mg/ℓ	0.193	0.280	0.308	0.470	0.316	0.313
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.500	0.153	0.153
ORTHO PHOSPHATE	mg/ℓ	5.200	0.044	0.077	0.081	0.071	0.068
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ			8.3			8.3
CALCIUM	mg/ℓ		5.4				5.4
MAGNESIUM	mg/ℓ		3.2				3.2
POTASSIUM	mg/ℓ		0.8				0.8
SODIUM	mg/ℓ		4.2				4.2

STATION: (4c) NJ Zinc Pipe #1
River Mile: 37.4
Description: (1b) 18" Ø at beginning of plant

Project LERMP: 1974	DATE	6/26	7/3	7/11	7/30	8/12	AVG
	TIME		1520	1510	1200		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		2"				
VELOCITY	fps		out 12"				
FLOW	cfs		0.3	0.3			0.3
TEMPERATURE	°C	24.5	28.5			28.5	28.5
pH (lab)		7.50	7.40	7.20	7.25		7.3
TOTAL ALKALINITY	mg/ℓ	7	8	26	7	9	8
TOTAL HARDNESS	mg/ℓ	32	20	14	32	20	23
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8	7.9			8.8	7.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.7	2.8			0.8	2.8
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.023	0.020	0.004	0.013	0.018	0.018
NITRATE (NO_3-N)	mg/ℓ	0.230	0.749	0.346	0.331	0.351	0.401
AMMONIA (NH_3-N)	mg/ℓ	0.220	0.190	0.280	0.330	0.224	0.263
KJELDAHL N. (TKN)	mg/ℓ		0.78				0.78
TOTAL PHOSPHATE	mg/ℓ					0.264	0.264
ORTHO PHOSPHATE	mg/ℓ	0.170	0.169	0.044	0.367	0.089	0.168
CHLORIDE	mg/ℓ			8.0			8.0
SULFATE	mg/ℓ			3.3			3.3
CALCIUM	mg/ℓ					4.1	4.1
MAGNESIUM	mg/ℓ					1.8	1.8
POTASSIUM	mg/ℓ					0.6	0.6
SODIUM	mg/ℓ					4.5	4.5

STATION: 5b NJ Zinc Pipe #7
River Mile: 36.9
Description: (1.b.) 200 yd. below dam
53" ø

Project LERMP: 1974	DATE	6/26	7/3	7/11		8/12	AVG
	TIME		1555	1525			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			7.9			7.9
TEMPERATURE	°C	24.0	34.5			32.0	33.0
pH (lab)		6.50		7.10			6.8
TOTAL ALKALINITY	mg/ℓ	17.0		8.0			13
TOTAL HARDNESS	mg/ℓ	30		26			28
DISSOLVED OXYGEN (DO)	mg/ℓ	8.5	7.4	8.1		7.7	7.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>9.0	2.7	0		0.5	3.8
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.037		0.003			0.037
NITRATE (NO_3-N)	mg/ℓ	0.475		0.382			0.428
AMMONIA (NH_3-N)	mg/ℓ	0.588		0.224			0.406
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.128		0.056			0.092
CHLORIDE	mg/ℓ			8.0			8.0
SULFATE	mg/ℓ			3.7			3.7
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						----

STATION: 5c NJ Zinc Pipe #8
River Mile: 36.8
Description:

Project LERMP: 1974	DATE	6/26	7/3	7/11		8/12	AVG
	TIME		1600				
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						1.33
TEMPERATURE	^{o}C						---
pH (lab)				6.40			6.4
TOTAL ALKALINITY	mg/ℓ			12		13	12
TOTAL HARDNESS	mg/ℓ			70		50	60
DISSOLVED OXYGEN (DO)	mg/ℓ						---
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ						---
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.009		0.015	0.012
NITRATE (NO_3-N)	mg/ℓ			0.468		0.378	0.423
AMMONIA (NH_3-N)	mg/ℓ			2.240		0.344	1.792
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.368	0.368
ORTHO PHOSPHATE	mg/ℓ			0.042		0.185	0.114
CHLORIDE	mg/ℓ			31.0			31.0
SULFATE	mg/ℓ			33.3			33.3
CALCIUM	mg/ℓ					11.7	11.7
MAGNESIUM	mg/ℓ					3.9	3.9
POTASSIUM	mg/ℓ					6.5	6.5
SODIUM	mg/ℓ					29.6	29.6

STATION: 5d NJ Zinc Pipe #9
River Mile: 36.5
Description:

Project LERMP: 1974	DATE	6/26	7/3	7/11			AVG
	TIME		1610				
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft		3"				
VELOCITY	fps						---
FLOW	cfs						1.62
TEMPERATURE	^{o}C		34.5				34.5
pH (lab)			7.15				7.2
TOTAL ALKALINITY	mg/ℓ		15				15
TOTAL HARDNESS	mg/ℓ		62				62
DISSOLVED OXYGEN (DO)	mg/ℓ						---
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ						---
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ		0.035				0.035
NITRATE (NO_3-N)	mg/ℓ		0.778				0.778
AMMONIA (NH_3-N)	mg/ℓ		1.154				1.154
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ		0.064				0.064
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (5e) Aquashicola Creek
River Mile: 35.9
Description: (1.b.) Just below Lehigh Gap

Project LERMP: 1974	DATE	6/26	7/3	7/12	7/30	8/12	AVG
	TIME			0900	1300		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	24.0	32.0		45.0		---
DEPTH	ft	1.8	1.5		1.8		---
VELOCITY	fps	1.5	1.5		1.5		---
FLOW	cfs	62.2	60.0		114.3		70.9
TEMPERATURE	^{o}C				23.5		23.5
pH (lab)		7.35		7.60	7.65		7.5
TOTAL ALKALINITY	mg/ℓ	31		20	21	26	24
TOTAL HARDNESS	mg/ℓ	80		124	74	82	79
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2		10.2	8.9	10.1	8.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.3		1.1	2.2	3.3	2.2
TOTAL COLIFORM	#/100ml	300			420	484	420
FECAL COLIFORM	#/100ml	11			31	6	31
FECAL STREPTOCOCCUS	#/100ml				1100	12	1110
NITRITE (NO_2-N)	mg/ℓ	0.036		0.170	0.024	0.033	0.031
NITRATE (NO_3-N)	mg/ℓ	0.576		1.008	0.405	0.297	0.426
AMMONIA (NH_3-N)	mg/ℓ	0.630		1.288	1.260	1.036	1.195
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.274	0.242	0.258
ORTHO PHOSPHATE	mg/ℓ	0.420		0.129	0.145	0.206	0.225
CHLORIDE	mg/ℓ			6.0			6.0
SULFATE	mg/ℓ			86.7			86.7
CALCIUM	mg/ℓ		29.7				29.7
MAGNESIUM	mg/ℓ		5.0				5.0
POTASSIUM	mg/ℓ		1.7				1.7
SODIUM	mg/ℓ		5.2				5.2

STATION: 6a Pfizer
River Mile: 35.0
Description:

Project LERMP: 1974	DATE					8/14	AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						0.77
TEMPERATURE	^{o}C					24.0	24.0
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ					8	8
TOTAL HARDNESS	mg/ℓ					58	58
DISSOLVED OXYGEN (DO)	mg/ℓ					7.1	7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ					1.0	1.0
TOTAL COLIFORM	#/100ml					3100	3100
FECAL COLIFORM	#/100ml					800	800
FECAL STREPTOCOCCUS	#/100ml					4	4
NITRITE (NO_2-N)	mg/ℓ					0.008	0.008
NITRATE (NO_3-N)	mg/ℓ					0.216	0.216
AMMONIA (NH_3-N)	mg/ℓ					0.560	0.560
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.193	0.193
ORTHO PHOSPHATE	mg/ℓ					0.149	0.149
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ					6.8	6.8
MAGNESIUM	mg/ℓ					4.2	4.2
POTASSIUM	mg/ℓ					5.4	5.4
SODIUM	mg/ℓ					244.5	244.5

STATION: 6b American Nickeloid
River Mile: 33.2
Description: (1.b.) 36" Chrome plater across from Slatington Sewage; chlorine effluent

Project LERMP: 1974	DATE	6/26	7/5	7/11	7/31	8/14	AVG
	TIME				1100		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft				0.082		---
VELOCITY	fps				3.0		
FLOW	cfs						0.1
TEMPERATURE	^{o}C				21.5	25.0	21.5
pH (lab)		9.30			7.20		8.2
TOTAL ALKALINITY	mg/ℓ	200			55	230	215
TOTAL HARDNESS	mg/ℓ	64			126	74	69
DISSOLVED OXYGEN (DO)	mg/ℓ	7.6			7.5	7.1	7.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				2.6	0.7	2.6
TOTAL COLIFORM	#/100ml				15,800		15,800
FECAL COLIFORM	#/100ml				7100		7100
FECAL STREPTOCOCCUS	#/100ml				2410		2400
NITRITE (NO_2-N)	mg/ℓ	0.374			0.022	0.095	0.058
NITRATE (NO_3-N)	mg/ℓ	2.016			0.378	0.622	0.500
AMMONIA (NH_3-N)	mg/ℓ	2.352			2.380	1.176	1.969
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.967	0.967
ORTHO PHOSPHATE	mg/ℓ	1.149			0.806	0.927	0.961
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				4.9		4.9
MAGNESIUM	mg/ℓ				5.2		5.2
POTASSIUM	mg/ℓ				96.9		96.9
SODIUM	mg/ℓ				770.3		770.3

STATION: 6c Slatington Sewage Pipe
River Mile: 33.2
Description: (r.b) 18"Ø across from Amer. Nickoloid

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/31	8/14	AVG
	TIME				1145		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs				0.44		0.44
TEMPERATURE	^{o}C				21.0	21.5	21.0
pH (lab)		7.20			7.10		7.2
TOTAL ALKALINITY	mg/ℓ	2			78	104	91
TOTAL HARDNESS	mg/ℓ	70			48	74	64
DISSOLVED OXYGEN (DO)	mg/ℓ	7.6			6.4	5.0	5.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>9.0			LA	17.6	17.6
TOTAL COLIFORM	#/100ml				750	LA	750
FECAL COLIFORM	#/100ml				66	LA	66
FECAL STREPTOCOCCUS	#/100ml				60	0	60
NITRITE (NO_2-N)	mg/ℓ	0.264			0.180	0.319	0.254
NITRATE (NO_3-N)	mg/ℓ	1.872			0.662	0.514	0.588
AMMONIA (NH_3-N)	mg/ℓ	22.40			14.00	21.00	19.13
KJELDAHL N. (TKN)	mg/ℓ	26.20					26.20
TOTAL PHOSPHATE	mg/ℓ					4.352	4.352
ORTHO PHOSPHATE	mg/ℓ	0.155			2.821	3.224	3.022
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				11.2		11.2
MAGNESIUM	mg/ℓ				8.3		8.3
POTASSIUM	mg/ℓ				10.4		10.4
SODIUM	mg/ℓ				36.9		36.9

STATION: 6d Keystone Lamp Co.
River Mile: 33.1
Description:

Project LERMP: 1974	DATE				8/12		AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						0.03
TEMPERATURE	^{o}C				22.0		22.0
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ				78		78
TOTAL HARDNESS	mg/ℓ				132		132
DISSOLVED OXYGEN (DO)	mg/ℓ				7.8		7.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				4.1		4.1
TOTAL COLIFORM	#/100ml				2200		2200
FECAL COLIFORM	#/100ml				950		950
FECAL STREPTOCOCCUS	#/100ml				590		590
NITRITE (NO_2-N)	mg/ℓ				0.330		0.330
NITRATE (NO_3-N)	mg/ℓ				0.297		0.297
AMMONIA (NH_3-N)	mg/ℓ				1.90		1.90
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				2.98		2.98
ORTHO PHOSPHATE	mg/ℓ				2.74		2.74
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				13.6		13.6
MAGNESIUM	mg/ℓ				7.1		7.1
POTASSIUM	mg/ℓ				6.5		6.5
SODIUM	mg/ℓ				67.4		67.4

STATION: (7b) Small Creek
River Mile: 33.0
Description: (1.b.)

Project LERMP: 1974	DATE	6/26					AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	1.0					1.0
TEMPERATURE	^{o}C						---
pH (lab)		7.30					7.30
TOTAL ALKALINITY	mg/ℓ	21					21
TOTAL HARDNESS	mg/ℓ	54					54
DISSOLVED OXYGEN (DO)	mg/ℓ	9.2					9.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.2					1.2
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.003					0.003
NITRATE (NO_3-N)	mg/ℓ	0.398					0.398
AMMONIA (NH_3-N)	mg/ℓ	0.630					0.630
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.322					0.322
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (7c) Trout Creek
River Mile: 32.9
Description: (r.b.) Slatington Tributary

Project LERMP: 1974	DATE	6/26	7/9	7/12	7/30		AVG
	TIME				1400		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	20.0	23.0		24.0		---
DEPTH	ft	0.9	1.2		0.6		---
VELOCITY	fps	0.7	0.6		0.6		---
FLOW	cfs	9.6	11.3		8.0		8.63
TEMPERATURE	^{o}C				22.5		22.5
pH (lab)				7.35	8.30		7.8
TOTAL ALKALINITY	mg/ℓ			0	37		19
TOTAL HARDNESS	mg/ℓ			22	108		65
DISSOLVED OXYGEN (DO)	mg/ℓ				7.1		7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				2.1		2.1
TOTAL COLIFORM	#/100ml				9700		9700
FECAL COLIFORM	#/100ml				5150		5200
FECAL STREPTOCOCCUS	#/100ml				6140		6100
NITRITE (NO_2-N)	mg/ℓ			0.530	0.015		0.530
NITRATE (NO_3-N)	mg/ℓ			0.403	0.351		0.377
AMMONIA (NH_3-N)	mg/ℓ			0.504	0.372		0.438
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.202		0.202
ORTHO PHOSPHATE	mg/ℓ			0.137	0.089		0.113
CHLORIDE	mg/ℓ			8.0			8.0
SULFATE	mg/ℓ			37.3			37.3
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (7e) Bertsch Creek
River Mile: 30.9
Description: (1.b.)

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/30		AVG
	TIME				1425		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	16.0	6.0		10.0		---
DEPTH	ft	1.0	0.3		0.3		---
VELOCITY	fps	0.4	1.3		1.3		---
FLOW	cfs	5.4	2.9		3.8		3.62
TEMPERATURE	^{o}C				23.0		23.0
pH (lab)		7.60		8.00	7.80		7.8
TOTAL ALKALINITY	mg/ℓ	31		36	32		33
TOTAL HARDNESS	mg/ℓ	68		56	64		63
DISSOLVED OXYGEN (DO)	mg/ℓ	10.0		9.8	7.3		7.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0		0.8	1.2		1.2
TOTAL COLIFORM	#/100ml				7100		7100
FECAL COLIFORM	#/100ml				1770		1800
FECAL STREPTOCOCCUS	#/100ml				2270		2300
NITRITE (NO_2-N)	mg/ℓ	0		0.003	0.013		0.005
NITRATE (NO_3-N)	mg/ℓ	0.389		1.008	0.265		0.327
AMMONIA (NH_3-N)	mg/ℓ	0.420		0.196	0.756		0.457
KJELDAHL N. (TKN)	mg/ℓ	1.41					1.41
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.530		0.056	0.270		0.400
CHLORIDE	mg/ℓ			5.0			5.0
SULFATE	mg/ℓ			33.3			33.3
CALCIUM	mg/ℓ		13.2				13.2
MAGNESIUM	mg/ℓ		4.5				4.5
POTASSIUM	mg/ℓ		0.8				0.8
SODIUM	mg/ℓ		4.1				4.1

STATION: (7g) Rockdale Creek
River Mile: 29.4
Description: (r.b.) Stone arch bridge at cabins
Muddy

Project LERMP: 1974	DATE	6/26					AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	0.5					0.5
TEMPERATURE	^{o}C						---
pH (lab)		7.10					7.10
TOTAL ALKALINITY	mg/ℓ	33					33
TOTAL HARDNESS	mg/ℓ	88					78
DISSOLVED OXYGEN (DO)	mg/ℓ	9.1					9.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.4					3.4
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.012					0.012
NITRATE (NO_3-N)	mg/ℓ	0.648					0.648
AMMONIA (NH_3-N)	mg/ℓ	0.140					0.140
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.048					0.048
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						----
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (10a) Fetl's Creek
River Mile: 25.9
Description: (r.b.)

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/31		AVG
	TIME				1330		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	4.0	4.0		3.1		---
DEPTH	ft	0.5	0.3		0.3		---
VELOCITY	fps	0.6	0.6		1.3		---
FLOW	cfs	1.1	0.7		1.0		0.97
TEMPERATURE	^{o}C				22.0		22.0
pH (lab)					7.90		7.9
TOTAL ALKALINITY	mg/ℓ				58		58
TOTAL HARDNESS	mg/ℓ				90		90
DISSOLVED OXYGEN (DO)	mg/ℓ				10.0		100
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				1.7		1.7
TOTAL COLIFORM	#/100ml				4300		4300
FECAL COLIFORM	#/100ml				920		920
FECAL STREPTOCOCCUS	#/100ml				240		240
NITRITE (NO_2-N)	mg/ℓ				0.013		0.013
NITRATE (NO_3-N)	mg/ℓ				0.540		0.540
AMMONIA (NH_3-N)	mg/ℓ				0.328		0.328
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ				0.867		0.867
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ				23.4		23.4
MAGNESIUM	mg/ℓ				11.6		11.6
POTASSIUM	mg/ℓ				5.7		5.7
SODIUM	mg/ℓ				7.8		7.8

STATION: (11a) Spring Run
River Mile: 24.6
Description:

Project LERMP: 1974	DATE	6/26	7/5	7/12	7/31		AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft		2.5		1.8		---
DEPTH	ft		0.3		0.2		---
VELOCITY	fps		1.4		0.4		---
FLOW	cfs		1.0		0.2		0.51
TEMPERATURE	^{o}C						26.0
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ						---
TOTAL HARDNESS	mg/ℓ						---
DISSOLVED OXYGEN (DO)	mg/ℓ						13.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ						3.5
TOTAL COLIFORM	#/100ml				1000		1000
FECAL COLIFORM	#/100ml				20		20
FECAL STREPTOCOCCUS	#/100ml				10		10
NITRITE (NO_2-N)	mg/ℓ						---
NITRATE (NO_3-N)	mg/ℓ						---
AMMONIA (NH_3-N)	mg/ℓ						---
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ						---
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (13a) Un-named Tributary
River Mile: 23.3
Description: 300 yds. below Northampton Dam (r.b.)

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1015				
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		1.0				1.0
TEMPERATURE	^{o}C		28.0		19.0		28.0
pH (lab)			7.3				7.3
TOTAL ALKALINITY	mg/ℓ		12			13	12
TOTAL HARDNESS	mg/ℓ		48			62	55
DISSOLVED OXYGEN (DO)	mg/ℓ		8.0		9.6	8.3	8.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		1.2		1.3	1.9	1.2
TOTAL COLIFORM	#/100ml		4000			0	4000
FECAL COLIFORM	#/100ml		70			0	70
FECAL STREPTOCOCCUS	#/100ml		170			0	170
NITRITE (NO_2-N)	mg/ℓ		0.066			0.007	0.066
NITRATE (NO_3-N)	mg/ℓ		0.425			0.270	0.348
AMMONIA (NH_3-N)	mg/ℓ		0.336			0.322	0.329
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.177	0.177
ORTHO PHOSPHATE	mg/ℓ		0.166			0.250	0.205
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						----
CALCIUM	mg/ℓ		11.7				11.7
MAGNESIUM	mg/ℓ		4.8				4.8
POTASSIUM	mg/ℓ		1.6				1.6
SODIUM	mg/ℓ		4.2				4.2

STATION: 13b Creek at Railroad Overpass
River Mile: 23.0
Description: (rb) 1 mi. below Northampton Dam Cement

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1040	1110	1000		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			0.5			0.5
TEMPERATURE	^{o}C		19.0	16.0	19.0		16.0
pH (lab)		8.10	8.30	8.10	8.30		8.2
TOTAL ALKALINITY	mg/ℓ	104	158	132	122		129
TOTAL HARDNESS	mg/ℓ	360	402	384	392		384
DISSOLVED OXYGEN (DO)	mg/ℓ	9.8	9.6	9.4		9.2	9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	∿0	∿0	2.0		1.3	2.0
TOTAL COLIFORM	#/100ml		7800	180	13,300	1900	7800
FECAL COLIFORM	#/100ml		260	63	150	230	260
FECAL STREPTOCOCCUS	#/100ml		200	132	180	30	160
NITRITE (NO_2-N)	mg/ℓ	0.023	0.037	0.004		0.026	0.029
NITRATE (NO_3-N)	mg/ℓ	2.448	2.052	1.188		0.284	1.896
AMMONIA (NH_3-N)	mg/ℓ	2.240	1.148	1.372		1.036	1.449
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.274	0.274
ORTHO PHOSPHATE	mg/ℓ	0.100	0.072	0.032		0.314	0.068
CHLORIDE	mg/ℓ			12.0			12.0
SULFATE	mg/ℓ			133.3			133.3
CALCIUM	mg/ℓ			65.9			65.9
MAGNESIUM	mg/ℓ			30.3			30.3
POTASSIUM	mg/ℓ			5.1			5.1
SODIUM	mg/ℓ			11.3			11.3

STATION: (13c) Hockendaqua Creek
River Mile: 22.7
Description: (1.b.)

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/1	8/14	AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	22.0	25.0		14.0		---
DEPTH	ft	1.0	1.0		0.9		---
VELOCITY	fps	0.9	1.0		1.2		---
FLOW	cfs	19.4	23.6		15.6		20.0
TEMPERATURE	^{o}C		27.0	26.0	22.5		22.5
pH (lab)			8.00	7.85	8.00		8.0
TOTAL ALKALINITY	mg/ℓ		59	63		72	65
TOTAL HARDNESS	mg/ℓ		124	128		132	128
DISSOLVED OXYGEN (DO)	mg/ℓ	4.4	8.0	7.6	9.4	9.5	9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.6	3.6	2.4	2.9	1.8	2.9
TOTAL COLIFORM	#/100ml		850	310	1100	2000	1100
FECAL COLIFORM	#/100ml		120	186	190	420	190
FECAL STREPTOCOCCUS	#/100ml		180	140	270	300	270
NITRITE (NO_2-N)	mg/ℓ		0.389	1.480		0.132	0.260
NITRATE (NO_3-N)	mg/ℓ		0.435	2.664		0.243	0.339
AMMONIA (NH_3-N)	mg/ℓ		2.492	0.476		1.344	0.793
KJELDAHL N. (TKN)	mg/ℓ		5.38				5.38
TOTAL PHOSPHATE	mg/ℓ					0.500	0.500
ORTHO PHOSPHATE	mg/ℓ		0.645	0.742		0.580	0.656
CHLORIDE	mg/ℓ			13.0			13.0
SULFATE	mg/ℓ			64.0			64.0
CALCIUM	mg/ℓ			32.4			32.4
MAGNESIUM	mg/ℓ			6.8			6.8
POTASSIUM	mg/ℓ			7.0			7.0
SODIUM	mg/ℓ			10.0			10.0

STATION: (16a) Coplay Creek
River Mile: 20.7
Description: (rb) light green

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1225	1300	1150		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	14.0	11.0		11.0		---
DEPTH	ft	1.0	0.7		0.7		---
VELOCITY	fps	1.0	1.3		0.8		---
FLOW	cfs	12.8	11.2		6.3		10.1
TEMPERATURE	^{o}C	16.0	20.5	20.5	18.0		18.0
pH (lab)			8.42	8.50	8.10		8.3
TOTAL ALKALINITY	mg/ℓ		131	146			138
TOTAL HARDNESS	mg/ℓ		258	246			252
DISSOLVED OXYGEN (DO)	mg/ℓ	9.9	9.0	9.0	9.1	9.2	9.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.2	0.3	1.6	1.7	1.5	1.7
TOTAL COLIFORM	#/100ml		3000	6900	6100	2400	6100
FECAL COLIFORM	#/100ml		1020	2200	1300	560	1300
FECAL STREPTOCOCCUS	#/100ml		860	630	2400	1200	2400
NITRITE (NO_2-N)	mg/ℓ		0.156	0.008			0.156
NITRATE (NO_3-N)	mg/ℓ		2.880	2.952			2.916
AMMONIA (NH_3-N)	mg/ℓ		0.868	0.784			0.826
KJELDAHL N. (TKN)	mg/ℓ		1.61				1.61
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ		0.093	0.077			0.085
CHLORIDE	mg/ℓ			16.5			16.5
SULFATE	mg/ℓ			100.0			100.0
CALCIUM	mg/ℓ			52.0			52.0
MAGNESIUM	mg/ℓ			21.9			21.9
POTASSIUM	mg/ℓ			7.4			7.4
SODIUM	mg/ℓ			11.0			11.0

STATION: 17a Catasaqua Sewage Plant
River Mile: 20.2
Description:

Project LERMP: 1974	DATE	6/27	7/15	7/15	8/6	8/19	AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						3.1
TEMPERATURE	^{o}C						22.0
pH (lab)							---
TOTAL ALKALINITY	mg/ℓ						---
TOTAL HARDNESS	mg/ℓ						---
DISSOLVED OXYGEN (DO)	mg/ℓ						6.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ						18.0
TOTAL COLIFORM	#/100ml					84,000	84,000
FECAL COLIFORM	#/100ml					8000	8000
FECAL STREPTOCOCCUS	#/100ml					4100	4100
NITRITE (NO_2-N)	mg/ℓ						---
NITRATE (NO_3-N)	mg/ℓ						---
AMMONIA (NH_3-N)	mg/ℓ						---
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ						---
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: (18a) Catasaqua Creek
River Mile: 19.8
Description: (1.b.)

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1300	1330	1215		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	10.0	9.0		10.0		---
DEPTH	ft	0.7	0.4		0.6		---
VELOCITY	fps	1.4	1.7		1.3		---
FLOW	cfs	9.0	6.2		7.6		7.88
TEMPERATURE	^{o}C		17.0	16.5	16.0		16.0
pH (lab)		8.10	8.20	8.20	8.10		8.2
TOTAL ALKALINITY	mg/ℓ	151	148	146			148
TOTAL HARDNESS	mg/ℓ	236	224	228			229
DISSOLVED OXYGEN (DO)	mg/ℓ	9.7	9.7	9.7	9.1	9.9	9.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	~0	0.9	1.3	2.4	1.9	2.4
TOTAL COLIFORM	#/100ml		2400	320	1800	1800	1800
FECAL COLIFORM	#/100ml		950	310	310	330	310
FECAL STREPTOCOCCUS	#/100ml		1040	230	820	385	820
NITRITE (NO_2-N)	mg/ℓ	0.069	0.004	0.012			0.040
NITRATE (NO_3-N)	mg/ℓ	2.160	0.504	2.736			2.448
AMMONIA (NH_3-N)	mg/ℓ	0.720	0.616	0.630			0.655
KJELDAHL N. (TKN)	mg/ℓ		1.38				1.38
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.285	0.097	0.072			0.084
CHLORIDE	mg/ℓ			9.5			9.5
SULFATE	mg/ℓ			73.3			73.3
CALCIUM	mg/ℓ		39.2				39.2
MAGNESIUM	mg/ℓ		25.5				25.5
POTASSIUM	mg/ℓ		2.6				2.6
SODIUM	mg/ℓ		7.7				7.7

STATION: 18b Concrete Overpass Creek
River Mile: 19.5
Description: (1b) Canal Outlet

Project LERMP: 1974	DATE	6/27	7/5	7/15			AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						1.0
TEMPERATURE	^{o}C						---
pH (lab)		8.70					8.7
TOTAL ALKALINITY	mg/ℓ	123					123
TOTAL HARDNESS	mg/ℓ	168					168
DISSOLVED OXYGEN (DO)	mg/ℓ	10.2					10.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	∿0					0
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.017					0.017
NITRATE (NO_3-N)	mg/ℓ	1.872					1.872
AMMONIA (NH_3-N)	mg/ℓ	0.585					0.585
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.260					0.260
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 18d GAF #2
River Mile: 19.4
Description: (rb) White Effluent

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/6	8/14	AVG
	TIME		1315	1345	1235		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft				5.0		---
VELOCITY	fps						---
FLOW	cfs		0.1	0.3			0.3
TEMPERATURE	^{o}C		20.0	22.0	27.0		27.0
pH (lab)			8.04	8.10	8.00		8.0
TOTAL ALKALINITY	mg/ℓ		99	98			98
TOTAL HARDNESS	mg/ℓ		156	128			142
DISSOLVED OXYGEN (DO)	mg/ℓ		9.7	7.7	8.0	7.8	8.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.0	0.4	11.0	1.3	1.1	1.3
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ		0.144	0.018			0.082
NITRATE (NO_3-N)	mg/ℓ		1.800	2.196			1.998
AMMONIA (NH_3-N)	mg/ℓ		0.266	0.476			0.371
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ		0.056	0.040			0.048
CHLORIDE	mg/ℓ			7.5			7.5
SULFATE	mg/ℓ			34.6			34.6
CALCIUM	mg/ℓ			25.7			25.7
MAGNESIUM	mg/ℓ			12.8			12.8
POTASSIUM	mg/ℓ			0.8			0.8
SODIUM	mg/ℓ			12.0			12.0

STATION: 19a Western Electric Tributary
River Mile: 18.0
Description: (1b) Millipedes noted

Project LERMP: 1974	DATE	6/27	7/5	7/15	8/1	8/14	AVG
	TIME		1430	1500			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	6.0		5.0	8.0		---
DEPTH	ft	0.5	1.5	0.4	0.7		---
VELOCITY	fps	1.3		1.1	1.1		---
FLOW	cfs	3.8		2.1	6.1		3.52
TEMPERATURE	°C	21.0	26.0	22.0			22.0
pH (lab)		7.75	7.80	7.95			7.8
TOTAL ALKALINITY	mg/ℓ	115	77	137	102		108
TOTAL HARDNESS	mg/ℓ	228	496	224	210		221
DISSOLVED OXYGEN (DO)	mg/ℓ	7.2	8.5	8.4	6.6	9.1	8.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.1	1.4	14.4	>6.6	1.6	14.4
TOTAL COLIFORM	#/100ml			90	1100		1100
FECAL COLIFORM	#/100ml			30	150		150
FECAL STREPTOCOCCUS	#/100ml			37	280		160
NITRITE (NO_2-N)	mg/ℓ	0.619	0.750	0.725	1.540		0.908
NITRATE (NO_3-N)	mg/ℓ	2.592	0.691	0.504	0.864		0.686
AMMONIA (NH_3-N)	mg/ℓ	0.840	2.520	0.868	4.060		0.859
KJELDAHL N. (TKN)	mg/ℓ		7.86				7.86
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.198	0.234	0.435	0.206		0.268
CHLORIDE	mg/ℓ			167.5			167.5
SULFATE	mg/ℓ			93.3			93.3
CALCIUM	mg/ℓ		40.6				40.6
MAGNESIUM	mg/ℓ		19.7				19.7
POTASSIUM	mg/ℓ		1.5				1.5
SODIUM	mg/ℓ		127.9				127.9

STATION: 20b Ingersoll Rand Pipe
River Mile: 17.2
Description:

Project LERMP: 1974	DATE	6/27	7/8	7/15			AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs						0.01
TEMPERATURE	^{o}C						---
pH (lab)		7.90					7.90
TOTAL ALKALINITY	mg/ℓ	141					141
TOTAL HARDNESS	mg/ℓ	196					196
DISSOLVED OXYGEN (DO)	mg/ℓ		9.4				9.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		∿0				0
TOTAL COLIFORM	#/100ml		400				400
FECAL COLIFORM	#/100ml		100				100
FECAL STREPTOCOCCUS	#/100ml		19				19
NITRITE (NO_2-N)	mg/ℓ	0.006					0.006
NITRATE (NO_3-N)	mg/ℓ	2.008					2.008
AMMONIA (NH_3-N)	mg/ℓ	0.365					0.365
KJELDAHL N. (TKN)	mg/ℓ	1.88					1.88
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.077					0.077
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 23a Allentown Wastewater Treatment Plant
River Mile: 16.4
Description: (r.b)

Project LERMP: 1974	DATE	6/28	7/8	7/16	8/7	8/15	AVG
	TIME			1030			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	54.7	52.5	54.7			54.7
TEMPERATURE	°C		21.5				21.5
pH (lab)		7.10		8.5	4.8		6.8
TOTAL ALKALINITY	mg/ℓ	158		274		304	245
TOTAL HARDNESS	mg/ℓ	232		222		212	222
DISSOLVED OXYGEN (DO)	mg/ℓ	4.4	4.9	3.3	2.8	7.0	3.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		10.1	78.0	>64.0	61.0	35.0
TOTAL COLIFORM	#/100ml		4400	3600			4000
FECAL COLIFORM	#/100ml		150	1600			1600
FECAL STREPTOCOCCUS	#/100ml		260	170			220
NITRITE (NO_2-N)	mg/ℓ	0.835		0.068		0.059	0.064
NITRATE (NO_3-N)	mg/ℓ	4.824		2.376		1.081	2.760
AMMONIA (NH_3-N)	mg/ℓ	3.300		20.30		8.68	10.760
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					2.313	2.313
ORTHO PHOSPHATE	mg/ℓ	3.054		3.387		2.176	2.872
CHLORIDE	mg/ℓ			6.5			6.5
SULFATE	mg/ℓ			73.3			73.3
CALCIUM	mg/ℓ			35.1			35.1
MAGNESIUM	mg/ℓ			25.2			25.2
POTASSIUM	mg/ℓ			10.9			10.9
SODIUM	mg/ℓ			121.0			121.0

STATION: 24a Little Lehigh Creek
River Mile: 16.1
Description: (rb)

Project LERMP: 1974	DATE	7/1	7/8	7/16	8/7	8/15	AVG
	TIME			1045			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	60.0		95.0			
DEPTH	ft	2.0		1.2			
VELOCITY	fps	1.2		0.9			
FLOW	cfs	138.0		123.3			124.5
TEMPERATURE	^{o}C	18.0		20.0	18.0	18.5	20.0
pH (lab)		7.80		7.20	8.1		7.7
TOTAL ALKALINITY	mg/ℓ	101		134	134		123
TOTAL HARDNESS	mg/ℓ	144		188	174		169
DISSOLVED OXYGEN (DO)	mg/ℓ	7.6	9.3	10.6	7.5	7.7	10.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.9	3.1	4.4	3.3	3.9	4.4
TOTAL COLIFORM	#/100ml		7600	8800	57,000		7600
FECAL COLIFORM	#/100ml		780	410	2280		780
FECAL STREPTOCOCCUS	#/100ml		700	140	2000		700
NITRITE (NO_2-N)	mg/ℓ	0.130		0.040	0.0396		0.070
NITRATE (NO_3-N)	mg/ℓ	1.872		2.340	0.405		2.106
AMMONIA (NH_3-N)	mg/ℓ	1.008		1.685	1.176		1.287
KJELDAHL N. (TKN)	mg/ℓ	3.91					3.91
TOTAL PHOSPHATE	mg/ℓ				0.177		0.177
ORTHO PHOSPHATE	mg/ℓ	0.113		0.044	0.185		0.114
CHLORIDE	mg/ℓ			14.5			14.5
SULFATE	mg/ℓ			33.3			33.3
CALCIUM	mg/ℓ			32.4			32.4
MAGNESIUM	mg/ℓ			23.9			23.9
POTASSIUM	mg/ℓ			2.9			2.9
SODIUM	mg/ℓ			11.5			11.5

STATION: 28a Stream at Ice House
River Mile: 11.9
Description: (1.b)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7		AVG
	TIME			1430	1205		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			0.04	0.1		0.1
TEMPERATURE	^{o}C			24.0	23.0		23.5
pH (lab)					7.9		7.9
TOTAL ALKALINITY	mg/ℓ			99	93		96
TOTAL HARDNESS	mg/ℓ			136	128		132
DISSOLVED OXYGEN (DO)	mg/ℓ			7.8	7.2		7.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ			1.3	1.5		1.5
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.008	0.004		0.006
NITRATE (NO_3-N)	mg/ℓ			0.072	0.243		0.158
AMMONIA (NH_3-N)	mg/ℓ			1.218	0.456		0.837
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.346		0.346
ORTHO PHOSPHATE	mg/ℓ			0.101	0.113		0.107
CHLORIDE	mg/ℓ			8.0			8.0
SULFATE	mg/ℓ			32.0			32.0
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 28d Beth Steel #2
River Mile: 11.6
Description: (r.b) covered outlet, black effluent (oil) at 300 yds downstream 72"Ø (001)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			0950	1210		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	2.0	0.1	NO FLOW	0.1		0.1
TEMPERATURE	^{o}C	26.5			19.5		19.5
pH (lab)		7.80	7.70				7.8
TOTAL ALKALINITY	mg/ℓ	30	26		13		23
TOTAL HARDNESS	mg/ℓ	66	24		20		22
DISSOLVED OXYGEN (DO)	mg/ℓ	7.0			8.1		8.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	4.1			2.8		2.8
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.143	0.002		0.0044		0.003
NITRATE (NO_3-N)	mg/ℓ	1.368	0.115		0.284		0.200
AMMONIA (NH_3-N)	mg/ℓ	0.868	0.168		1.148		1.008
KJELDAHL N. (TKN)	mg/ℓ	2.58					2.58
TOTAL PHOSPHATE	mg/ℓ				0.790		0.790
ORTHO PHOSPHATE	mg/ℓ	0.190	0.181		0.250		0.207
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 28c · Bethlehem Steel #3
River Mile: 11.5
Description: (r.b) Covered effluent below 6th smoke stack
72"Ø (002)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME			1000	1230		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	0.024	1.4	8.3	6.0		6.0
TEMPERATURE	^{o}C			29.0	28.0		28.0
pH (lab)		5.20	7.70	8.20			7.8
TOTAL ALKALINITY	mg/ℓ	9	12	155	26	26	18
TOTAL HARDNESS	mg/ℓ	18	64	272	60	56	60
DISSOLVED OXYGEN (DO)	mg/ℓ			7.5	7.1		7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>9.0		8.4	3.1		3.1
TOTAL COLIFORM	#/100ml		9800				9800
FECAL COLIFORM	#/100ml						4000
FECAL STREPTOCOCCUS	#/100ml		3000				3000
NITRITE (NO_2-N)	mg/ℓ	0.020	0.004	0.022	0.057	0.031	0.027
NITRATE (NO_3-N)	mg/ℓ	0.164	1.044	3.024	0.378	0.460	1.014
AMMONIA (NH_3-N)	mg/ℓ	1.960	0.546	1.036	0.927	0.364	1.068
KJELDAHL N. (TKN)	mg/ℓ	5.47					5.47
TOTAL PHOSPHATE	mg/ℓ				0.959	0.279	0.619
ORTHO PHOSPHATE	mg/ℓ	0.064	0.177	0.081	0.218	0.294	0.167
CHLORIDE	mg/ℓ			16.0			16.0
SULFATE	mg/ℓ			53.3			53.3
CALCIUM	mg/ℓ			35.0			35.0
MAGNESIUM	mg/ℓ			36.1			36.1
POTASSIUM	mg/ℓ			7.4			7.4
SODIUM	mg/ℓ			6.7			6.7

STATION: (29a) Monocacy Creek
River Mile: 11.3
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME			1015	1250		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	32.0		45.0			---
DEPTH	ft	1.2		0.8			---
VELOCITY	fps	1.8		1.5			---
FLOW	cfs	70.0		54.7			57.1
TEMPERATURE	^{o}C	18.0		15.0	16.5	17.0	15.0
pH (lab)		8.40	8.45	7.70			8.2
TOTAL ALKALINITY	mg/ℓ	126	160	46	158		148
TOTAL HARDNESS	mg/ℓ	242	270	92	270		261
DISSOLVED OXYGEN (DO)	mg/ℓ	12.1		10.3	10.7	10.3	10.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.5		1.6	1.2	2.1	1.6
TOTAL COLIFORM	#/100ml	3700	1120	2800	2500		2500
FECAL COLIFORM	#/100ml	630	960	1000	700		800
FECAL STREPTOCOCCUS	#/100ml	430	380	300	750		400
NITRITE (NO_2-N)	mg/ℓ	0.037	0.011	0.134	0.015		0.021
NITRATE (NO_3-N)	mg/ℓ	2.880	3.348	1.368	0.649		2.532
AMMONIA (NH_3-N)	mg/ℓ	0.882	0.770	0.616	0.868		0.784
KJELDAHL N. (TKN)	mg/ℓ	1.09					1.09
TOTAL PHOSPHATE	mg/ℓ				0.548		0.548
ORTHO PHOSPHATE	mg/ℓ	0.072	0.097	0.339	0.105		0.091
CHLORIDE	mg/ℓ			4.0			4.0
SULFATE	mg/ℓ			28.7			28.7
CALCIUM	mg/ℓ			17.5			17.5
MAGNESIUM	mg/ℓ			12.3			12.3
POTASSIUM	mg/ℓ			4.0			4.0
SODIUM	mg/ℓ			9.1			9.1

STATION: 29b Bethlehem Steel #4
River Mile: 11.4
Description: (1b) 50 yd past Monocacy Creek
Below green powerhouse (003)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME			1030	1245		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps		0.				---
FLOW	cfs		0.01	NO FLOW	0.1		0.1
TEMPERATURE	^{o}C				24.5	23.5	24.5
pH (lab)			6.75				6.8
TOTAL ALKALINITY	mg/ℓ		77		24		77
TOTAL HARDNESS	mg/ℓ		102		44		102
DISSOLVED OXYGEN (DO)	mg/ℓ				4.8	6.9	4.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				>12.6	4.8	13.0
TOTAL COLIFORM	#/100ml					300	300
FECAL COLIFORM	#/100ml					20	20
FECAL STREPTOCOCCUS	#/100ml					0	0
NITRITE (NO_2-N)	mg/ℓ		0.003		0.0121		0.008
NITRATE (NO_3-N)	mg/ℓ		1.512		0.405		0.958
AMMONIA (NH_3-N)	mg/ℓ		3.080		1.400		2.175
KJELDAHL N. (TKN)	mg/ℓ		33.51				33.51
TOTAL PHOSPHATE	mg/ℓ				0.806		0.806
ORTHO PHOSPHATE	mg/ℓ		0.056		0.121		0.088
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 29 e Bethlehem Steel #7
River Mile: 11.0
Description: (r.b) 66"Ø 50 yds below green powerhouse (005)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			1040	1310		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		99.0	66.4	99		99.0
TEMPERATURE	°C	34.0		34.0	33.5		33.5
pH (lab)		7.90	7.72	7.60			7.7
TOTAL ALKALINITY	mg/ℓ	20	16	68	51		39
TOTAL HARDNESS	mg/ℓ	86	102	124	100		103
DISSOLVED OXYGEN (DO)	mg/ℓ			7.7	6.8		6.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	1.9		2.4	2.6		2.6
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.099	2.700	0.172	0.075		0.115
NITRATE (NO_3-N)	mg/ℓ	2.304	1.584	2.016	0.419		1.968
AMMONIA (NH_3-N)	mg/ℓ	5.18	9.10	4.06	4.34		5.670
KJELDAHL N. (TKN)	mg/ℓ	13.45	112.64				13.45
TOTAL PHOSPHATE	mg/ℓ				1.45		1.45
ORTHO PHOSPHATE	mg/ℓ	0.242	0.274	0.516	0.306		0.334
CHLORIDE	mg/ℓ			11.5			11.5
SULFATE	mg/ℓ			80.0			80.0
CALCIUM	mg/ℓ			20.9			20.9
MAGNESIUM	mg/ℓ			20.3			20.3
POTASSIUM	mg/ℓ			6.0			6.0
SODIUM	mg/ℓ			13.8			13.8

STATION: 29f Beth Steel #8
River Mile: 10.9
Description: (r.b) Above concrete "intake"; 200 yds below green 36" Ø powerhouse; 500 yds. upstream from Minsi Trail Bridge (006).

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			1055	1315		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps			14.2	21.8	10	
FLOW	cfs						14.2
TEMPERATURE	^{o}C	32.0		34.0	32.0		32.0
pH (lab)		7.40	8.30	8.10			7.9
TOTAL ALKALINITY	mg/ℓ	38	46	66	44		46
TOTAL HARDNESS	mg/ℓ	80	108	128	84		98
DISSOLVED OXYGEN (DO)	mg/ℓ			7.4	7.3		7.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.9		2.7	3.6		2.7
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.167	0.027	0.700	0.097		0.097
NITRATE (NO_3-N)	mg/ℓ	2.808	1.512	1.872	0.419		2.064
AMMONIA (NH_3-N)	mg/ℓ	1.190	1.372	1.694	1.302		1.390
KJELDAHL N. (TKN)	mg/ℓ		10.76				10.76
TOTAL PHOSPHATE	mg/ℓ				0.629		0.629
ORTHO PHOSPHATE	mg/ℓ	0.290	0.379	0.532	0.282		0.371
CHLORIDE	mg/ℓ			24.5			24.5
SULFATE	mg/ℓ			58.0			58.0
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 29g Beth Steel #9
River Mile: 10.9
Description: (r.b) 30 yds. below intake
42"Ø (007)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			1100	1330		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		3.6	32.0	14.6		14.6
TEMPERATURE	^{o}C	29.0		30.0	31.5		31.5
pH (lab)		7.30	8.25	7.90			7.8
TOTAL ALKALINITY	mg/ℓ	29	48	65	44		46
TOTAL HARDNESS	mg/ℓ	80	100	128	84		98
DISSOLVED OXYGEN (DO)	mg/ℓ			7.6	7.0		7.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	7.4		2.8	3.3		3.3
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.156	0.010	0.620	0.095		0.087
NITRATE (NO_3-N)	mg/ℓ	2.376	1.728	2.016	0.351		2.040
AMMONIA (NH_3-N)	mg/ℓ	1.484	0.644	1.792	1.232		1.503
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.242		0.242
ORTHO PHOSPHATE	mg/ℓ	0.218	0.258	0.532	0.322		0.332
CHLORIDE	mg/ℓ			23.0			23.0
SULFATE	mg/ℓ			60.0			60.0
CALCIUM	mg/ℓ		22.4				22.4
MAGNESIUM	mg/ℓ		18.1				18.1
POTASSIUM	mg/ℓ		6.8				6.8
SODIUM	mg/ℓ		17.3				17.3

STATION: 29h Beth Steel #10
River Mile: 10.8
Description: (r.b.) Cream color; below powerhouse between powerlines 78"Ø crossing ~300 yds. upstream from Minsi Trail Bridge (008)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			1110	1335		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		10.2	10.2	10.2		10.2
TEMPERATURE	°C	32.0		33.0	34.5		34.5
pH (lab)		7.60	8.70	7.90			8.1
TOTAL ALKALINITY	mg/ℓ	48	106	15	52		50
TOTAL HARDNESS	mg/ℓ	92	184	132	96		126
DISSOLVED OXYGEN (DO)	mg/ℓ			6.9	6.7		6.7
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	3.9		2.8	3.4		3.4
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.186	0.009	0.520	0.108		0.271
NITRATE (NO_3-N)	mg/ℓ	2.052	1.872	0.230	0.405		0.318
AMMONIA (NH_3-N)	mg/ℓ	0.882	1.082	0.980	1.092		1.009
KJELDAHL N. (TKN)	mg/ℓ		20.16				20.16
TOTAL PHOSPHATE	mg/ℓ				0.242		0.242
ORTHO PHOSPHATE	mg/ℓ	0.185	0.444	0.331	0.306		0.316
CHLORIDE	mg/ℓ			80.0			80.0
SULFATE	mg/ℓ			113.0			113.0
CALCIUM	mg/ℓ			22.4			22.4
MAGNESIUM	mg/ℓ			19.4			19.4
POTASSIUM	mg/ℓ			6.5			6.5
SODIUM	mg/ℓ			51.3			51.3

STATION: 29i Beth Steel #11
River Mile: 10.6
Description: (rb) Under Minsi Trail Bridge
78" Ø (009)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7		AVG
	TIME			1130	1345		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		1.4	8.0	8.6		8.6
TEMPERATURE	°C	30.0		30.5	30.0		30.0
pH (lab)		7.65	8.02	7.60			7.8
TOTAL ALKALINITY	mg/ℓ	52	80	73	52		64
TOTAL HARDNESS	mg/ℓ	102	110	132	102		112
DISSOLVED OXYGEN (DO)	mg/ℓ			7.5	6.6		6.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>9.0		3.9	4.2		4.2
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.121	0.006	0.460	0.145		0.242
NITRATE (NO_3-N)	mg/ℓ	1.584	2.736	2.160	0.419		2.160
AMMONIA (NH_3-N)	mg/ℓ	0.784	1.064	0.896	1.232		1.008
KJELDAHL N. (TKN)	mg/ℓ	3.28					3.28
TOTAL PHOSPHATE	mg/ℓ				0.403		0.403
ORTHO PHOSPHATE	mg/ℓ	0.173	0.435	0.419	0.435		0.366
CHLORIDE	mg/ℓ			27.5			27.5
SULFATE	mg/ℓ			55.3			55.3
CALCIUM	mg/ℓ			22.4			22.4
MAGNESIUM	mg/ℓ			20.3			20.3
POTASSIUM	mg/ℓ			6.0			6.0
SODIUM	mg/ℓ			17.8			17.8

STATION: 30a Bethlehem Steel #12
River Mile: 10.3
Description: (rb) 0.3 mi below Minsi Trail Bridge
48"Ø Across from radio tower

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME		1315	1155	1405		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		2.8	3.0	1.3		1.3
TEMPERATURE	°C	34.0		27.0	33.5		33.5
pH (lab)		7.00	8.30	7.80			7.7
TOTAL ALKALINITY	mg/ℓ	43	50	30		58	45
TOTAL HARDNESS	mg/ℓ	88	124	122		108	110
DISSOLVED OXYGEN (DO)	mg/ℓ			8.4	6.8		6.8
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	5.4		3.6	>6.8		7.0
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.179	0.006	0.360		0.429	0.323
NITRATE (NO_3-N)	mg/ℓ	1.764	1.944	0.210		0.460	1.854
AMMONIA (NH_3-N)	mg/ℓ	0.588	0.588	1.148		0.742	0.766
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.355	0.355
ORTHO PHOSPHATE	mg/ℓ	0.210	0.379	0.500		0.355	0.361
CHLORIDE	mg/ℓ			83.0			83.0
SULFATE	mg/ℓ			100.0			100.0
CALCIUM	mg/ℓ			22.4			22.4
MAGNESIUM	mg/ℓ			17.7			17.7
POTASSIUM	mg/ℓ			6.5			6.5
SODIUM	mg/ℓ			41.3			41.3

STATION: 30b Beth Steel #13
River Mile: 10.2
Description: (r.b) 18"Ø (019)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7		AVG
	TIME						
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs				8.4		8.4
TEMPERATURE	^{o}C			35.0	30.0		32.5
pH (lab)				7.70			7.70
TOTAL ALKALINITY	mg/ℓ			65	45		55
TOTAL HARDNESS	mg/ℓ			124	90		107
DISSOLVED OXYGEN (DO)	mg/ℓ				8.3		8.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				1.0		1.0
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.194	0.165		0.180
NITRATE (NO_3-N)	mg/ℓ			1.872	0.324		1.872
AMMONIA (NH_3-N)	mg/ℓ			1.568	0.560		1.568
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.129		0.129
ORTHO PHOSPHATE	mg/ℓ			0.379	0.141		0.260
CHLORIDE	mg/ℓ			14.5			14.5
SULFATE	mg/ℓ			45.3			45.3
CALCIUM	mg/ℓ			20.4			20.4
MAGNESIUM	mg/ℓ			16.8			16.8
POTASSIUM	mg/ℓ			4.3			4.3
SODIUM	mg/ℓ			12.9			12.9

STATION: 30c Bethlehem Steel #14
River Mile: 10.2
Description: (r.b.) (021)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7	8/15	AVG
	TIME			1525	1445		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs				0.2		0.2
TEMPERATURE	^{o}C				25.0		25.0
pH (lab)				8.00			8.0
TOTAL ALKALINITY	mg/ℓ			65	44	57	55
TOTAL HARDNESS	mg/ℓ			108	88	108	101
DISSOLVED OXYGEN (DO)	mg/ℓ				6.4		6.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				3.3		3.3
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.250	0.090	0.248	0.249
NITRATE (NO_3-N)	mg/ℓ			1.800	0.124	0.500	0.312
AMMONIA (NH_3-N)	mg/ℓ			1.680	1.050	1.036	1.255
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.677	0.419	0.548
ORTHO PHOSPHATE	mg/ℓ			0.415	0.338	0.395	0.383
CHLORIDE	mg/ℓ			19.0			19.0
SULFATE	mg/ℓ			53.3			53.3
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 30d Beth Steel #15
River Mile: 10.2
Description: (rb) 10"Ø (022)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7	8/15	AVG
	TIME				1440		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			1.94	0.9		0.9
TEMPERATURE	^{o}C				30.0		30.0
pH (lab)				7.90			7.9
TOTAL ALKALINITY	mg/ℓ			63	47	58	56
TOTAL HARDNESS	mg/ℓ			128	82	106	105
DISSOLVED OXYGEN (DO)	mg/ℓ				6.4		6.4
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				3.3		3.3
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.360	0.075	0.063	0.069
NITRATE (NO_3-N)	mg/ℓ			1.512	0.297	0.384	0.340
AMMONIA (NH_3-N)	mg/ℓ			1.568	1.120	1.512	1.400
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.258	0.435	0.346
ORTHO PHOSPHATE	mg/ℓ			0.403	0.415	0.427	0.415
CHLORIDE	mg/ℓ			18.5			18.5
SULFATE	mg/ℓ			61.3			61.3
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						----
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 30e Beth Steel #16
River Mile: 10.2
Description: (r.b) 12" ∅ (023)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7	8/15	AVG
	TIME				1440		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			1.4			1.4
TEMPERATURE	^{o}C				25.0		25.0
pH (lab)				8.10			8.1
TOTAL ALKALINITY	mg/ℓ			64	47	56	56
TOTAL HARDNESS	mg/ℓ			114	84	110	103
DISSOLVED OXYGEN (DO)	mg/ℓ				7.20		7.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				4.5		4.5
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.310	0.070	0.319	0.314
NITRATE (NO_3-N)	mg/ℓ			1.548	0.108	0.568	1.058
AMMONIA (NH_3-N)	mg/ℓ			1.624	1.400	0.644	1.223
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.500	0.548	0.524
ORTHO PHOSPHATE	mg/ℓ			0.419	0.306	0.371	0.365
CHLORIDE	mg/ℓ			20.0			20.0
SULFATE	mg/ℓ			48.0			48.0
CALCIUM	mg/ℓ			20.9			20.9
MAGNESIUM	mg/ℓ			17.1			17.1
POTASSIUM	mg/ℓ			4.6			4.6
SODIUM	mg/ℓ			11.6			11.6

STATION: 30f Beth Steel #17
River Mile: 10.2
Description: (rb) 36"Ø (011)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME				1450		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			53.6			53.6
TEMPERATURE	°C				34.0		34.0
pH (lab)				8.00			8.0
TOTAL ALKALINITY	mg/ℓ			65	45		55
TOTAL HARDNESS	mg/ℓ			116	84		100
DISSOLVED OXYGEN (DO)	mg/ℓ				6.2		6.2
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				3.5		3.5
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.300	0.095		0.300
NITRATE (NO_3-N)	mg/ℓ			0.331	0.189		0.260
AMMONIA (NH_3-N)	mg/ℓ			1.792	0.938		1.365
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.371		0.371
ORTHO PHOSPHATE	mg/ℓ			0.500	0.387		0.444
CHLORIDE	mg/ℓ			18.5			18.5
SULFATE	mg/ℓ			49.3			49.3
CALCIUM	mg/ℓ			21.4			21.4
MAGNESIUM	mg/ℓ			16.8			16.8
POTASSIUM	mg/ℓ			4.8			4.8
SODIUM	mg/ℓ			12.0			12.0

STATION: 30g Beth Steel #18
River Mile: 10.1
Description: (rb) Oily (014)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME				1500		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs				10.7		10.7
TEMPERATURE	^{o}C				30.0		30.0
pH (lab)				8.00			8.0
TOTAL ALKALINITY	mg/ℓ			48	52	63	54
TOTAL HARDNESS	mg/ℓ			150	92	112	118
DISSOLVED OXYGEN (DO)	mg/ℓ				7.3		7.3
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				4.7		4.7
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ			0.330	0.101	0.231	0.221
NITRATE (NO_3-N)	mg/ℓ			0.317	0.881	0.514	0.416
AMMONIA (NH_3-N)	mg/ℓ			1.288	0.840	0.700	0.943
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.467	0.403	0.435
ORTHO PHOSPHATE	mg/ℓ			0.282	0.387	0.330	0.330
CHLORIDE	mg/ℓ			22.0			22.0
SULFATE	mg/ℓ			86.7			86.7
CALCIUM	mg/ℓ			21.9			21.9
MAGNESIUM	mg/ℓ			18.1			18.1
POTASSIUM	mg/ℓ			5.1			5.1
SODIUM	mg/ℓ			25.1			25.1

STATION: 30h Beth Steel #19
River Mile: 10.1
Description: (rb) 30"Ø (012)

Project LERMP: 1974	DATE	7/1	7/9	7/16	8/7		AVG
	TIME			1550	1505		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs				6.3		6.3
TEMPERATURE	°C				25.0		25.0
pH (lab)				8.0			8.0
TOTAL ALKALINITY	mg/ℓ			68	44	56	56
TOTAL HARDNESS	mg/ℓ			122	98	102	107
DISSOLVED OXYGEN (DO)	mg/ℓ				7.6		7.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ				4.7		4.7
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						----
NITRITE (NO_2-N)	mg/ℓ			0.340	0.078	0.372	0.356
NITRATE (NO_3-N)	mg/ℓ			2.412	0.068	0.568	0.568
AMMONIA (NH_3-N)	mg/ℓ			2.016	0.888	0.868	0.878
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ				0.419	0.355	0.387
ORTHO PHOSPHATE	mg/ℓ			0.415	0.435	0.274	0.375
CHLORIDE	mg/ℓ			21.0			21.0
SULFATE	mg/ℓ			53.3			53.3
CALCIUM	mg/ℓ			16.1			16.1
MAGNESIUM	mg/ℓ			10.8			10.8
POTASSIUM	mg/ℓ			3.3			3.3
SODIUM	mg/ℓ			8.7			8.7

STATION: 30i Beth Steel #20
River Mile: 9.8
Description: (rb) 200 yds below island
Grease & Oil prevalent (013)

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME			1215	1520		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs			10.0	6.7		6.7
TEMPERATURE	°C			29.0	28.5	30.0	28.5
pH (lab)		8.20					8.2
TOTAL ALKALINITY	mg/ℓ	32		64	44	55	49
TOTAL HARDNESS	mg/ℓ	92		136	98	114	110
DISSOLVED OXYGEN (DO)	mg/ℓ			6.3	7.1	8.7	7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	6.2		2.9	3.2	4.9	3.2
TOTAL COLIFORM	#/100ml						---
FECAL COLIFORM	#/100ml						---
FECAL STREPTOCOCCUS	#/100ml						---
NITRITE (NO_2-N)	mg/ℓ	0.190		0.410	0.119	0.308	0.257
NITRATE (NO_3-N)	mg/ℓ	2.52		2.016	0.108	0.581	1.706
AMMONIA (NH_3-N)	mg/ℓ	0.826		1.050	0.700	0.560	0.784
KJELDAHL N. (TKN)	mg/ℓ						2.50
TOTAL PHOSPHATE	mg/ℓ				0.500	0.596	0.548
ORTHO PHOSPHATE	mg/ℓ	0.153		0.282	0.314	0.379	0.282
CHLORIDE	mg/ℓ			20.5			20.5
SULFATE	mg/ℓ			60.0			60.0
CALCIUM	mg/ℓ			23.4			23.4
MAGNESIUM	mg/ℓ			19.4			19.4
POTASSIUM	mg/ℓ			6.2			6.2
SODIUM	mg/ℓ			16.3			16.3

STATION: (31a) Saucon Creek
River Mile: 9.4
Description:

Project LERMP: 1974	DATE	7/1	7/9	7/17	8/7	8/15	AVG
	TIME		1330	1232			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	45.0		47.0			---
DEPTH	ft	0.8		0.9	1.8		---
VELOCITY	fps	2.0		2.2			---
FLOW	cfs	70.0		93.0			92.0
TEMPERATURE	^{o}C	23.0		22.0	18.0	25.0	22.0
pH (lab)		7.10	8.10	7.90			7.7
TOTAL ALKALINITY	mg/ℓ	16	39	102	106		104
TOTAL HARDNESS	mg/ℓ	156	190	180	174		175
DISSOLVED OXYGEN (DO)	mg/ℓ			7.1	7.8	9.4	7.1
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	> 9.0		12.4	38.0	10.8	12.4
TOTAL COLIFORM	#/100ml	7700	620	2040	33,400		5000
FECAL COLIFORM	#/100ml	640	490	205	750		550
FECAL STREPTOCOCCUS	#/100ml	460	300	38	200		250
NITRITE (NO_2-N)	mg/ℓ	0.101	0.640	0.840	0.528		0.527
NITRATE (NO_3-N)	mg/ℓ	4.464	2.448	3.024	0.622		3.312
AMMONIA (NH_3-N)	mg/ℓ	12.180	13.020	21.00	13.72		14.98
KJELDAHL N. (TKN)	mg/ℓ		19.66				19.66
TOTAL PHOSPHATE	mg/ℓ				1.306		1.306
ORTHO PHOSPHATE	mg/ℓ	1.210	0.331	1.048	1.209		1.156
CHLORIDE	mg/ℓ			26.0			26.0
SULFATE	mg/ℓ			96.7			96.7
CALCIUM	mg/ℓ			27.2			27.2
MAGNESIUM	mg/ℓ			27.8			27.8
POTASSIUM	mg/ℓ			10.4			10.4
SODIUM	mg/ℓ			12.9			12.9

STATION: (32a) Nancy Run
River Mile: 8.5
Description: (1.b.)

Project LERMP: 1974	DATE	7/1	7/9	7/17/	8/7		AVG
	TIME		1415	1400			
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft	15.0	16.0				---
DEPTH	ft	0.6	0.5				---
VELOCITY	fps	1.4	1.0				---
FLOW	cfs	11.7	8.4		6.9		8.62
TEMPERATURE	^{o}C	20.0		17.0	17.0	18.5	17.0
pH (lab)		7.80	8.50	8.30			8.2
TOTAL ALKALINITY	mg/ℓ	80	66	202		195	198
TOTAL HARDNESS	mg/ℓ	238	244	268		272	256
DISSOLVED OXYGEN (DO)	mg/ℓ			9.6	8.7	9.7	8.7
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	0.8		1.2	0.9	1.8	0.9
TOTAL COLIFORM	#/100ml		4700	4400			4550
FECAL COLIFORM	#/100ml		410	410			410
FECAL STREPTOCOCCUS	#/100ml		220	380			300
NITRITE (NO_2-N)	mg/ℓ	0.012	0.016	0.008		0.011	0.012
NITRATE (NO_3-N)	mg/ℓ	3.096	3.312	2.952		0.616	3.120
AMMONIA (NH_3-N)	mg/ℓ	0.896	0.728	0.840		0.812	0.819
KJELDAHL N. (TKN)	mg/ℓ		2.79				2.79
TOTAL PHOSPHATE	mg/ℓ					0.226	0.226
ORTHO PHOSPHATE	mg/ℓ	0.081	0.064	0.060		0.157	0.090
CHLORIDE	mg/ℓ			15.5			15.5
SULFATE	mg/ℓ			42.0			42.0
CALCIUM	mg/ℓ			21.4			21.4
MAGNESIUM	mg/ℓ			41.3			41.3
POTASSIUM	mg/ℓ			3.3			3.3
SODIUM	mg/ℓ			7.0			7.0

STATION: 36a Cement Arch Down From Island
River Mile: 4.7
Description: (r.b) Pipe trickling down to river

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME		1000				
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs		0.02				0.02
TEMPERATURE	^{o}C						---
pH (lab)			8.30				8.3
TOTAL ALKALINITY	mg/ℓ		114			85	100
TOTAL HARDNESS	mg/ℓ		168			112	140
DISSOLVED OXYGEN (DO)	mg/ℓ		8.6				8.6
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ		5.3				5.3
TOTAL COLIFORM	#/100ml		4100				4100
FECAL COLIFORM	#/100ml		2540				2500
FECAL STREPTOCOCCUS	#/100ml		3940				4000
NITRITE (NO_2-N)	mg/ℓ		0.014			0.079	0.046
NITRATE (NO_3-N)	mg/ℓ		1.98			0.419	0.419
AMMONIA (NH_3-N)	mg/ℓ		0.98			0.840	0.910
KJELDAHL N. (TKN)	mg/ℓ						---
TOTAL PHOSPHATE	mg/ℓ					0.467	0.467
ORTHO PHOSPHATE	mg/ℓ		0.149			0.290	0.220
CHLORIDE	mg/ℓ						---
SULFATE	mg/ℓ						---
CALCIUM	mg/ℓ						---
MAGNESIUM	mg/ℓ						---
POTASSIUM	mg/ℓ						---
SODIUM	mg/ℓ						---

STATION: 36b Effluent from Crivellaro & Sons Dairy
River Mile: 4.4
Description: (rb) Under stone bridge; platform: 12' wide

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1135	1015		1055		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft		1.0				---
DEPTH	ft		0.083				---
VELOCITY	fps						---
FLOW	cfs			0.4	0.4		0.4
TEMPERATURE	^{o}C			19.0	23.0	16.0	23.0
pH (lab)		7.00	7.10	6.90			7.0
TOTAL ALKALINITY	mg/ℓ	65	80	82	84		78
TOTAL HARDNESS	mg/ℓ	104	104	116	112		109
DISSOLVED OXYGEN (DO)	mg/ℓ	5.6	2.4	~ 0	1.0	3.5	1.0
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	>>9	>90	>28	>64		100
TOTAL COLIFORM	#/100ml				166,000	335,000	250,000
FECAL COLIFORM	#/100ml				147,000	196,000	175,000
FECAL STREPTOCOCCUS	#/100ml		5480		7300	50,000	50,000
NITRITE (NO_2-N)	mg/ℓ	0.099	0.360	0.037	0.020		0.052
NITRATE (NO_3-N)	mg/ℓ	1.368	0.648	0.216	0.526		0.463
AMMONIA (NH_3-N)	mg/ℓ	0.470	0.532	1.232	1.652		1.254
KJELDAHL N. (TKN)	mg/ℓ	2.70	15.09				15.09
TOTAL PHOSPHATE	mg/ℓ						---
ORTHO PHOSPHATE	mg/ℓ	0.274	0.242	0.355	0.927		0.450
CHLORIDE	mg/ℓ			12.0			12.0
SULFATE	mg/ℓ			29.3			29.3
CALCIUM	mg/ℓ			14.6			14.6
MAGNESIUM	mg/ℓ			14.2			14.2
POTASSIUM	mg/ℓ			3.8			3.8
SODIUM	mg/ℓ			17.2			17.2

STATION: 36c Lehigh Valley Chemical Co.
River Mile: 3.3
Description: (rb) 50 yds above Glendon Dam

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	1205	1045		1120		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	0.03	0.02	0.01			0.02
TEMPERATURE	°C			16.0		13.0	16.0
pH (lab)		8.20	8.30	8.40			8.3
TOTAL ALKALINITY	mg/ℓ	103	100	84		102	97
TOTAL HARDNESS	mg/ℓ	148	144	148		142	146
DISSOLVED OXYGEN (DO)	mg/ℓ	10.5	10.5	10.0		11.2	10.5
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	~0	0.8	LA		3.1	0.8
TOTAL COLIFORM	#/100ml	8000					8000
FECAL COLIFORM	#/100ml						1000
FECAL STREPTOCOCCUS	#/100ml						500
NITRITE (NO_2-N)	mg/ℓ	0.006	0.009	0.014		0.035	0.014
NITRATE (NO_3-N)	mg/ℓ	2.016	1.836	1.759		0.405	1.870
AMMONIA (NH_3-N)	mg/ℓ	0.249	0.224	0.280		0.414	0.292
KJELDAHL N. (TKN)	mg/ℓ		4.78				4.78
TOTAL PHOSPHATE	mg/ℓ					0.129	0.129
ORTHO PHOSPHATE	mg/ℓ	0.060	0.113	0.387		0.089	0.087
CHLORIDE	mg/ℓ			8.5			8.5
SULFATE	mg/ℓ			32.0			32.0
CALCIUM	mg/ℓ			14.6			14.6
MAGNESIUM	mg/ℓ			14.8			14.8
POTASSIUM	mg/ℓ			3.0			3.0
SODIUM	mg/ℓ			6.7			6.7

STATION: 39a Ingersoll-Rand Effluent
River Mile: 1.6
Description: (1.b) Many Millipede Noted

Project LERMP: 1974	DATE	7/2	7/10	7/19	8/2	8/16	AVG
	TIME	~~1350~~	~~1330~~		~~1330~~		
MEASUREMENT	UNITS	1	2	3	4	5	
WIDTH	ft						---
DEPTH	ft						---
VELOCITY	fps						---
FLOW	cfs	0.4	60	0.25			0.4
TEMPERATURE	°C	~18		17.0	18.5	17.0	18.0
pH (lab)		8.10	7.90	8.20			8.1
TOTAL ALKALINITY	mg/ℓ	194	193	191	195	192	193
TOTAL HARDNESS	mg/ℓ	270	260	260	256	262	262
DISSOLVED OXYGEN (DO)	mg/ℓ	10.9	9.8	10.4	10.6	9.9	10.9
BIOCHEMICAL OXYGEN DEMAND (BOD_5)	mg/ℓ	2.0	2.6	LA	4.0	2.8	2.0
TOTAL COLIFORM	#/100ml	2350				33	2400
FECAL COLIFORM	#/100ml					1500	1500
FECAL STREPTOCOCCUS	#/100ml					2200	2200
NITRITE (NO_2-N)	mg/ℓ	0.017	0.020	0.054	0.050	0.092	0.047
NITRATE (NO_3-N)	mg/ℓ	2.736	2.664	3.168	0.540	0.662	2.856
AMMONIA (NH_3-N)	mg/ℓ	1.092	0.644	1.036	1.050	1.134	1.078
KJELDAHL N. (TKN)	mg/ℓ		2.20				2.20
TOTAL PHOSPHATE	mg/ℓ					1.209	1.209
ORTHO PHOSPHATE	mg/ℓ	0.056	1.371	0.605	2.136	1.330	1.360
CHLORIDE	mg/ℓ			21.5			21.5
SULFATE	mg/ℓ			50.0			50.0
CALCIUM	mg/ℓ			30.2			30.2
MAGNESIUM	mg/ℓ			38.7			38.7
POTASSIUM	mg/ℓ			3.3			3.3
SODIUM	mg/ℓ			11.4			11.4

APPENDIX C

Lehigh River Water Quality Criteria

Excerpts from Pennsylvania
Department of Environmental Resources
Publications

WATER QUALITY STANDARDS
WATER QUALITY MANAGEMENT
IMPLEMENTATION PLAN
INTRASTATE WATERS
LEHIGH RIVER BASIN AND
TRIBUTARIES TO DELAWARE RIVER FROM
LEHIGH RIVER TO TOCKS ISLAND

I. WATER QUALITY CRITERIA - Water quality criteria for the area set forth in Part II, "Scope" of this implementation plan were presented to the Environmental Quality Board for adoption and for publication in the Pennsylvania Bulletin.

II. SCOPE - This implementation plan sets forth the treatment requirements and effluent standards for existing discharges and for discharges in the area that have been planned by project sponsors that discharge to surface waters. The area is located in the Lehigh River basin and includes tributary streams of the Delaware River between the Lehigh River and Tocks Island. Practically all of the waters considered in this report are in the counties of Lehigh, Northampton, Carbon and Monroe with very small portions in the counties of Luzerne, Schuylkill, Berks, Wayne, Lackawanna, Pike and Bucks.

These waters include all intrastate streams, creeks, rivulets, lakes, dammed waters, ponds, springs and all other bodies of surface water or parts thereof, whether natural or artificial within the boundaries of this Commonwealth which are not a part of waste treatment works.

III. GENERAL - The Department of Environmental Resources, in accordance with its powers under the Clean Streams Law, hereby notifies all persons or municipalities under its jurisdiction to abate pollution to comply with the criteria. The Department will in all cases require either immediate abatement or the submission of a detailed abatement schedule providing for abatement within as short a period of time as is technically possible and will cause appropriate investigations to be made to assure itself of compliance with the standards.

Facilities are expected to be designed to meet the criteria at the critical periods. In addition, facilities must be operated at all times at that level of efficiency needed to meet requirements for the critical conditions. This will result in stream quality higher than the criteria most of the time.

A minimum of secondary treatment or its equivalent, is required for all waste discharges in this area.

Secondary treatment is that treatment that will reduce the organic waste load as measured by the biochemical oxygen demand test by at least 85 percent during the period May 1 to October 31 and by at least 75 percent during the remainder of the year based on a five consecutive day average of values; will remove practically all of the suspended solids; will provide satisfactory disposal of sludge; and will reduce the quantities of oil, greases, acids, alkalis, toxic, taste and odor producing substances, color, and other substances inimical to the public interest to levels that will not pollute the receiving stream.

Effective disinfection to control disease producing organisms shall be the production of an effluent which will contain a concentration not greater than 200/100 ml of Fecal Coliform organisms as a geometric average value nor greater than 1000/100 ml of these organisms in more than 10 percent of the samples tested.

Industrial wastes are to be given treatment equivalent to the secondary treatment of sewage. Appropriate in-plant reduction of wastes may be applied to these requirements.

IV. SPECIFIC - In certain waters of this area, secondary treatment of the present waste discharges is inadequate now, or will be in the future, if the water quality criteria are to be met. The following abatement requirements for tertiary treatment of wastes or other methods of advanced water quality control are needed in addition to secondary treatment and other minimum treatment requirements as set forth in the Department of Environmental Resources Rules and Regulations.

The values will be used where appropriate to allocate pound per day limits for substances in sewage and in industrial process waters. No allocations for these substances shall be made for cooling waters.

A. Lehigh River Basin

I. For discharges to the main stem of Lehigh River from Bertsch Creek at Lockport to the Delaware River.

a. The 5-day BOD shall not exceed 20 mg/1.
b. Ammonia shall not exceed 3 mg/1 as N.
c. Total suspended solids shall not exceed 30 mg/1.

II. For discharges to the Upper Lehigh River and all tributaries downstream of 25 acre impoundments and upstream of the Francis Walter Dam.

a. The 5-day BOD shall not exceed 25 mg/1.
b. Ammonia shall not exceed 4 mg/1 as N.
c. Total suspended solids shall not exceed 25 mg/1.

III. For discharges above impoundments in the upper, upper Lehigh River basin from source to the dams on 25 acre impoundments. This area is directly upstream of A-II as described above.

a. The 5-day BOD shall not exceed 10 mg/1.
b. Ammonia shall not exceed 3 mg/1 as N.
c. Total suspended solids shall not exceed 20 mg/1.
d. Phosphorus shall not exceed 0.5 mg/1 as P.

IV. For discharges to tributaries of the Lehigh River from Bertsch Creek at Lockport to the Delaware River.

a. The 5-day BOD shall not exceed 25 mg/1.
b. The ammonia shall not exceed 4 mg/1.
c. The total suspended solids shall not exceed 25 mg/1.

V. For discharges to Pohopoco Creek watershed from source to Beltzville Dam.

a. The 5-day BOD shall not exceed 10 mg/1.
b. Ammonia shall not exceed 3 mg/1 as N.
c. Total suspended solids shall not exceed 20 mg/1.
d. Phosphorus shall not exceed 0.5 mg/1 as P.

VI. For waste discharges in the Lehigh River basin above impoundments with a surface area greater than 25 acres that were not specifically covered.

a. The 5-day BOD shall not exceed 10 mg/1.
b. Ammonia shall not exceed 3 mg/1 as N.
c. Total suspended solids shall not exceed 20 mg/1.
d. Phosphorus shall not exceed 0.5 mg/1 as P.

REPORT OF THE BUREAU OF SANITARY ENGINEERING
TO THE SANITARY WATER BOARD
RECOMMENDED WATER QUALITY STANDARDS
FOR SURFACE WATERS

LEHIGH RIVER BASIN AND
DELAWARE RIVER TRIBUTARIES TO TOCKS ISLAND

I. PURPOSE OF THE REPORT

In order to control pollution and manage the quality of Pennsylvania's waters, the Sanitary Water Board is establishing water quality standards for the State's waters and revising existing standards where necessary. This report is a part of this continuing program and recommends water quality criteria for a portion of the State's surface waters. Information is provided in the report on the steps necessary to obtain the water quality specified by the criteria. This report is being distributed to industrial and municipal officials, legislators, organizations and other interested persons prior to a public hearing to be held in Bethlehem, Pennsylvania, on January 12, 1971. The hearing will give those interested persons and municipalities an opportunity to express their views and desires related to these criteria and plans of implementation. Based on this report and the testimony presented at the hearing, and that received within 30 days after the hearing, the Board should then establish water quality criteria and pollution control measures which includes an implementation plan necessary for management of the waters considered in the report. The Board should issue appropriate orders as provided for in the implementation plan.

II. SCOPE OF REPORT

This report considers the surface waters of the Lehigh River Basin and tributary streams of the Delaware River between the Lehigh River and Tocks Island. The area is further described in Section III-A of this report. These waters include all intrastate streams, creeks, rivulets, dams, waters, ponds, springs and all other bodies of surface water or parts thereof, whether natural or artificial, within the boundaries of this Commonwealth that are not a part of waste treatment facilities.

III. DESCRIPTION OF AREA

A. NATURAL FEATURES OF THE AREA - There are 178 named streams and about 1,000 unnamed streams in the 1,900 square mile area considered. Streams with a drainage area in excess of 50 square miles include the Lehigh River, and Tobyhanna, Tunkhannock, Bear, Pohopoco, Lizard, Aquashicola, Little Lehigh, Jordan, Monocacy, Saucon, Brodhead, and Bushkill Creeks. Stream elevations vary from 160 to 2,200 feet above mean sea level.

The hearing area mainly lies in the Valley and Ridge Physiographic provinces with minor areas in the Appalachian Plateau, Piedmont, and New England provinces. The area is underlain by extensive shale, sandstone, conglomerates and limestone formations, most of which are covered by glacial deposits. Considerable limestone quarrying is performed. Coal mining was also performed on the watersheds of Sandy Run, Buck Mountain Run, Black Creek, and Nesquehoning Creek watersheds.

Average streamflows range from 0.98 to 2.00 cubic feet per second per square mile (cfsm) (13.33 to 27.20 inches per year respectively). Natural drought flows range from 0 cfsm to 0.25 cfsm and averages about 0.10 cfsm for the area. One cfsm is equal to 650,000 gallons per day per square mile of area drained.

B. CULTURAL FEATURES.- The hearing area includes practically all of four counties (Lehigh, Northampton, Carbon, and Monroe) and very small portions of five counties (Luzerne, Schuylkill, Berks, Wayne, and Lackawanna). The area has 116 cities, boroughs, and townships. The population in 1960 was 521,000 while preliminary census figures indicate a 1970 population of 561,000.

The Allentown and Bethlehem areas are highly industrialized and manufactures a wide variety of products. Steel, paper mill, and textiles are some of the products from the hearing area.

Population in the Lehigh River Basin is mainly concentrated in the Allentown, Bethlehem, and Easton Areas. Lesser, but some other significant population concentrations are located in the Boroughs of Northampton, Catasauqua, and Lehighton.

Other population concentration areas on tributary streams include the Boroughs of Bangor and Penn Argyl on the Martins Creek watershed; Boroughs of Stroudsburg and East Stroudsburg on the Brodhead Creek watershed; and Boroughs of Nazareth and Wind Gap on the Bushkill Creek watershed.

Population is expected to increase and, unless adequate steps are taken now, water pollution problems on the Brodhead Creek watershed are expected to become more acute with the development of the Tocks Island project and the Delaware Gap National Recreational area.

Steps are being taken to develop the Lehigh Gorge State Park which is on both sides of the Lehigh River and extends from the Francis W. Walters Dam to Jim Thorpe. The Lehigh River in this area is used by canoe enthusiasts for white water boating. The area is high scenic. With the development of the Lehigh Gorge State Park, recreational use will increase. The Lehigh Gorge State Park should be preserved as a conservation area.

During the past two or three decades, many municipalities in the area have experienced population growth and industrial development which produces larger quantities of wastes that require treatment. Some municipalities have not kept pace with the development and have not provided adequate sewerage conveyance and treatment facilities. This has resulted in water pollution and public health problems. In some cases, inadequate operation of treatment facilities has caused water pollution problems.

Four tributaries of the Lehigh River--Sandy Run, Buck Mountain Creek, Black Creek, and Nesquehoning Creek--have highly acid (pH 3.7 to 4.8) water which degrades the quality of these four streams. The quality of Lehigh River is adversely affected from Sandy Run to approximately Walnutport, a distance of about 40 miles.

From Allentown to the Delaware River at Easton, the Lehigh River is degraded by oxygen consuming materials. Sampling survey data indicated that dissolved oxygen decreases sharply from 9.5 at Allentown to 3.6 mg/1 at Easton.

Other smaller streams are also being adversely affected because of inadequate treatment being provided. Examples of streams and waste discharges in the category are: Martins Creek watershed, municipal and textile wastes; Saucon Creek, municipal and mining wastes; and Brodhead Creek, municipal and paper mill wastes.

The action program necessary to eliminate present and future water quality problems are recommended in Section VII of this report titled "Abatement Plan"

IV. WATER USES

In the establishment of water quality standards, designation of present and future water uses is important since it is for the protection of designated water uses that water quality standards are established. A major purpose of the public hearing is to determine water uses and to urge local residents, municipal and industrial officials, and interested persons to give their opinions on the uses that they desire to see of the surface waters in the area. The Department of Health has recommended certain water uses for all waters of this area. More detailed water use descriptions are given in Appendix A.

The recommended water uses follow:

A. Water uses to be protected apply to all waters described in Section II and III of this report.

1. Warm water fishery
2. Domestic, industrial, livestock, wildlife and irrigation water supply
3. Recreational uses for boating, fishing, water contact sports and natural areas.
4. Hydroelectric power generation and treated waste assimilation and transport.

B. In certain portions of the hearing area, clean water conditions that presently exist or that we hope to achieve will permit additional uses of the waters. These uses apply to surface waters within the described watershed area. The areas and the additional water use are designated below.

1. Group "A" - Conservation Area

   a. Paradise Creek Watershed - (Tributary of Brodhead Creek)

   b. Pocono Creek Watershed - (Tributary of Brodhead Creek)

   c. Lehigh River Watershed - from headwaters to Route 903 bridge crossing main stem of the Lehigh River at Jim Thorpe.

2. Group "A" - Cold Water Fishery

   a. Brodhead Creek Watershed - (except Paradise and Pocono Creek Watersheds)

   b. Little Lehigh Creek Watershed

3. Group "B" - Trout Stocking Waters

a. Main Stem of Lehigh River and tributaries from Route 903 bridge crossing the main stem of the Lehigh River at Jim Thorpe to dam at Allentown.

b. All tributary streams to the Lehigh River from dam at Allentown to the mouth of the Delaware River, except the Little Lehigh Creek Watershed.

c. All tributary streams to the Delaware River between the Lehigh River and Tocks Island; except Brodhead Creek Watershed since higher water quality criteria applies.

V. WATER QUALITY CRITERIA

A. PURPOSE - The purpose of the water quality criteria is to provide a basis for engineering of pollution abatement projects. Where natural conditions preclude achievement of the criteria, the statement "or natural conditions" is implied.

B. GENERAL WATER QUALITY CRITERIA - The general water quality criteria apply to all waters at all times and are as follows:

The water shall not contain substances attributable to municipal, industrial or other waste discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life. Specific substances to be controlled include, but are not limited to, floating debris, oil, scum and other floating materials; toxic substances; substances that produce color, taste, odors or settle to form sludge deposits.

C. SPECIFIC WATER QUALITY CRITERIA - Specific water quality criteria are numerical values or limits for measurable water quality indicators. The water quality criteria listed below are of principal concern for controlling water pollution in this area. The list of specific water quality criteria does not include all possible substances that could cause pollution. For substances not listed, the general criterion that these substances shall not be inimical or injurious to the desi-nated water uses applies. The best scientific information available will be used to adjudge the suitability of a given waste discharge where these substances are involved. The specific water quality criteria designated herein are, we believe, adequate to protect the designated uses. If investigation or further evidence should reveal that they are inadequate to protect the designated uses, adjustments will be made so that the uses are adequately protected.

VI. SPECIFIC WATER QUALITY CRITERIA FOR WATERS CONSIDERED IN THIS REPORT

The criteria recommended for streams are in all cases maximum or minimum values that should be reached only during critical flow conditions. The critical flow is considered as the average minimum flow that occurs during seven consecutive days of any one year and has a recurrence interval of ten years, whether the flow is regulated or not. For flows lower than this, the general water quality criteria apply. The critical recommended for lakes, dammed waters, ponds, and all other bodies of surface waters apply at all times.

It is recommended that the Sanitary Water Board adopt the general water quality criteria (Section VI-D) for all waters at all times and the following specific water quality criteria for the waters hereafter considered, for the protection of the present and future water uses that have been described.

A. The following water quality criteria apply to conservation areas:

a. pH - not less than 6.0; not to exceed 8.5
b. Dissolved oxygen - minimum daily average of 7.0 mg/1 with no value less than 6.0 mg/1.
c. Total iron - not to exceed 1.5 mg/1
d. Temperature - not to exceed a 2°F. rise above natural temperature or a maximum of 58°F., whichever is less.
e. Dissolved solids - not to exceed 500 mg/1 as a monthly average value; not to exceed 750 mg/1 at any time
f. Bacteria (coliforms/100 ml) - for the period May 15 to September 15 of any year; not to exceed 1,000/100 ml as an arithmetic average value; not to exceed 1,000 per 100 ml in more than two consecutive samples; not to exceed 2,400 per 100 ml in more than one sample.

   For the period September 16 to May 14 of any year; not to exceed 5,000/100 ml as an average monthly average value, not to exceed this number by more than 20% of the samples collected during the month; nor to exceed 20,000/100 ml in more than 5% of the samples.

It is recommended that the following watersheds be designated as conservation areas:

1. Paradise Creek Watershed
2. Pocono Creek Watershed
3. Lehigh River Watershed from its headwaters to Route 903 bridge crossing the main stem of the Lehigh River at Jim Thorpe.

B. The following water quality criteria apply to waters to be used as a cold waters fishery:

a. pH - not less than 6.0: not to exceed 8.5
b. Dissolved oxygen - no value less than 6.0 mg/1 in flowing streams and no value less than 5.0 mg/1 at any point in lakes, ponds and reservoirs
c. Total iron - not to exceed 1.5 mg/1
d. Temperature - not to be increased by more than 5°F. above natural temperature, nor to be increased above 58°F.; not to be changed by more than 2°F. furing any one hour period.
e. Dissolved solids - not to exceed 500 mg/1 as the monthly average value; not to exceed 750 mg/1 at any time
f. Bacteria (coliforms per 100 ml) for the period May 15 to September 15 of any year; not to exceed 1,000 per 100 ml as an arithmetic average value; not to exceed 1,000 per 100 ml in more than two consecutive samples; not to exceed 2,400 per 100 ml in more than one sample.

   For the period September 16 to June 14 of any year; not to exceed 5,000 per 100 ml as a monthly average value, not to exceed this number in more than 20% of the samples collected during any month; not to exceed 20,000 per 100 ml in more than 5% of the samples.

It is recommended that the cold water fishery water quality criteria be established for the following waters:

1. Brodhead Creek Watershed (-xcept Paradis Creek and Pocono Creek Watersheds)
2. Little Lehigh Creek Watershed

C. The following water quality criteria apply to trout-stocking waters:

a. pH - not less than 6.0; not to exceed 8.5
b. Dissolved oxygen - for the period March 15 to June 30 of any year, no value less than 5.0 mg/1. For the remainder of the year, no value less than 4.0 mg/1.
c. Total iron - not to exceed 1.5 mg/1
d. Temperature - for the period March 15 to June 30 of any year; not to exceed a 5°F. rise above ambient temperature or a maximum of 74°F., whichever is less; not to be changed by more than 2°F. during any one hour period. For the remainder of the year, not to exceed 87°F.
e. Dissolved solids - not to exceed 500 mg/1 as the monthly average value; not to exceed 750 mg/1 at any time
f. Bacteria (coliforms per 100 ml) for the period May 15 to September 15 of any year; not to exceed 1,000 per 100 ml as an arithmetic average value; not to exceed 1,000 per 100 ml in more than two consecutive samples; not to exceed 2,400 per 100 ml in more than one sample.

   For the period September 16 to May 14 of any year; not to exceed 5,000 per 100 ml as a monthly average value, not to exceed this number in more than 20% of the samples collected during any month; not to exceed 20,000 per 100 ml in more than 5% of the samples.

It is recommended that trout-stocking water criteria be established for the following waters:

1. Main stem of the Lehigh River Watershed from Route 903 bridge crossing the Lehigh River at Jim Thorpe to the Allentown Dam on the Lehigh River.
2. All tributary streams to the Lehigh River from the Allentown dam on the Lehigh River to the mouth of the Delaware River, except Little Lehigh Creek Watershed.
3. All tributary streams to the Delaware River between the Lehigh River and Tocks Island except those with higher water quality criteria.

D. It is recommended that the following water quality criteria be established for the main stem of the Lehigh River from the dam at Allentown to the mouth of the Lehigh River at the Delaware River:

a. pH - not less than 6.0; not to exceed 8.5
b. Dissolved oxygen - minimum daily average of 5.0 mg/1 with no value less than 4.0 mg/1
c. Total iron - not to exceed 1.5 mg/1
d. Temperature - not to exceed a 5°F. rise above ambient temperature or a maximum of 80.5°F. whichever is less; not to be changed by more than 2°F. during any one hour period
e. Dissolved solids - not to exceed 500 mg/1 as a monthly average value; not to exceed 750 mg/1 at any time
f. Bacteria (coliforms/100 ml) - for the period May 15 to September 15 of any year; not to exceed 1,000/100 ml as an arithmetic average value; not to exceed 1,000 per 100 ml in more than two consecutive samples; not to exceed 2,400 per 100 ml in more than one sample.

   For the period September 16 to May 14 of any year; not to exceed 5,000/100 ml as an average monthly average value, not to exceed this number by more than 20% of the samples collected during the month; nor to exceed 20,000/100 ml in more than 5% of the samples.

VII. ABATEMENT PLAN

GENERAL - Abatement requirements included in this report are an indication of the treatment levels needed to attain the criteria. These are estimates based on generally accepted strengths of raw sewage and on information available for industrial wastes. Where tertiary or other advanced waste treatment is required, a specific abatement plan will define minimum treatment requirements in terms or pounds or maximum effluent concentration. The specific abatement plan will be developed after the criteria are established. Upon approval of the criteria presented in Section V and VI, the Bureau of Sanitary Engineering recommends that the Sanitary Water Board, in accordance with its powers under the Clean Streams Law, issue appropriate orders, modify permits or take other appropriate action to have all persons or municipalities under its jurisdiction abate pollution to comply with the criteria. It is recommended that the Board, in all cases, require either immediate abatement or the submission of a detailed abatement schedule providing for abatement within as short a period of time as is technically possible and that the Board cause appropriate investigations to be made to assure itself of compliance with the standards.

Facilities are expected to be designed to meet the criteria and BOD reductions accomplished to meet the dissolved oxygen goals at the critical period. In addition, facilities needed to meet requirements for the critical conditions must be efficiently operated at all times. This will result in stream quality higher than the criteria most of the time.

SPECIFIC - A minimum of secondary treatment or its equivalent is required for all waste discharges in this area.

Secondary treatment is that treatment that will reduce the organic waste load as measured by the biochemical oxygen demand test by at least 85% during the period May 1 to October 31 and by at least 75% during the remainder of the year based on a five consecutive day average of values; will remove practically all of the suspended solids; will provide effective disinfection to control disease producing organisms; will provide satisfactory disposal of sludge; and will reduce the quantities of oil, greases, acids, alkalis, toxic, taste and odor producing substances, color and other substances inimical to the public interest to levels that will not pollute the receiving stream.

Effective disinfection to control disease producing organisms shall be the production of an effluent which will contain a concentration not greater than 200/100 ml of fecal coliform organisms as a geometric average value nor greater than 1,000/100 ml of these organisms in more than 10% of the samples tested.

Industrial wastes are to be given treatment equivalent to the secondary treatment of sewage. Appropriate in-plant reduction of wastes may be applied to these requirements.

In certain waters of this area, secondary treatment of the present waste discharges is inadequate now, or will be in the future, if the water quality criteria recommended in Section VI of this report are to be met. Abatement requirements for tertiary treatment of wastes or other methods of advanced water quality (in conjunction with mine drainage abatement for some areas) are an estimate of the needs for the following waters in this area.

APPENDIX D

FLOW MEASUREMENT INFORMATION

1. Flow Estimation for Circular Pipe Outfalls
2. Ott Meter Calibration
3. Lehigh River Flow Computer Program

FLOW ESTIMATION FOR CIRCULAR PIPE OUTFALLS

A. Critical Depth Method[1].

Assumptions:

1. Pipe is partially full
2. Pipe is approximately horizontal
3. Observed depth is critical depth (Δc)

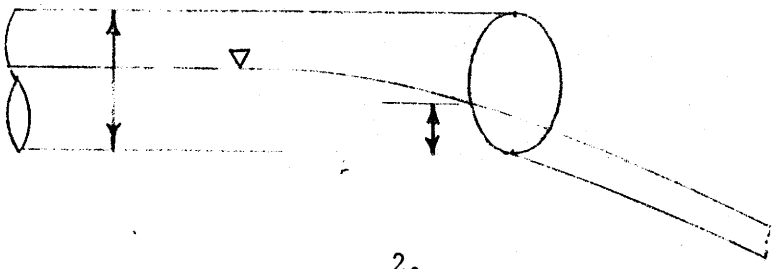
$$Q = K_c' \, d^{5/2}$$

Where:

Q = flow in cfs

d = pipe diameter

$K_c' = f(\frac{\Delta c}{d})$ from Table 8-10



B. Trajectory Method[2].

$$v = \frac{x}{t} = \frac{x}{\left(\frac{2y}{g}\right)^{\frac{1}{2}}}$$

$$Q = \frac{\pi d^2}{4} (v)$$

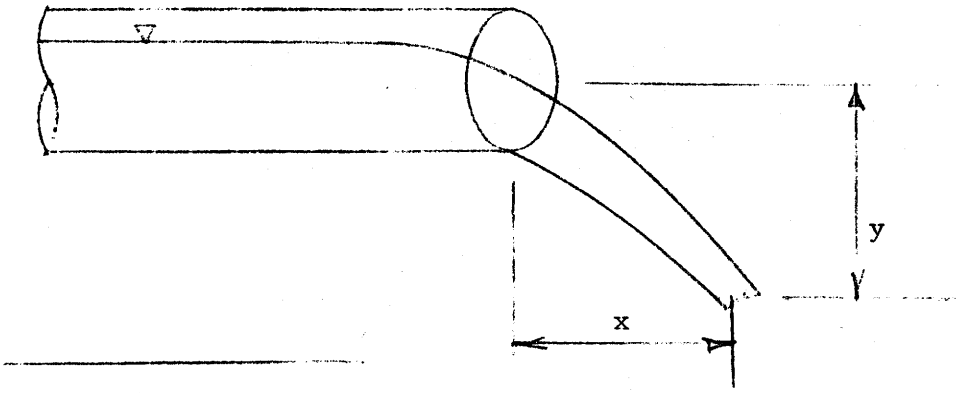
Where:

v = velocity in fps

x = distance out in ft

y = fall in ft

g = gravitational constant



1. King & Brater, Handbook of Hydraulics, 5th Ed.
2. Water Measurement Manual, U. S. Dept. of the Interior, 1967.

OTT METER CALIBRATION

FLUME DISTANCE 39.0 FEET DATE: 8/27/74

TRIAL	TIME (SEC)	REVOLUTIONS	REVOLUTIONS PER SECOND (N)	VELOCITY (FEET/SEC)
1	34.55	23	0.67	1.13
2	22.19	23	1.04	1.76
3	16.58	23	1.39	2.35
4	14.16	23	1.62	2.75
5	12.51	23	1.84	3.12
6	10.66	23	2.16	3.66
7	9.85	23	2.34	3.96
8	8.77	23	2.62	4.45

Velocity calculated from Ott meter equation

$V = 1.6466\ (N) + 0.046$

TRIAL	REVOLUTIONS PER SECOND (N)	VELOCITY FEET/SEC
1	0.67	1.15
2	1.04	1.76
3	1.39	2.34
4	1.62	2.71
5	1.84	3.08
6	2.16	3.60
7	2.34	3.90
8	2.62	4.36

Calibration curve on following page.

(2) $\text{Slope} = \frac{2.62 - 0.67}{5.76 - 1.13}$

$= \underline{.587}$

$N = .587V + 0.0$

$V = 1.704(N) + 0.0$

(1) $\text{Slope} = \frac{2.62 - 0.67}{4.36 - 1.15}$

$= \underline{.607}$

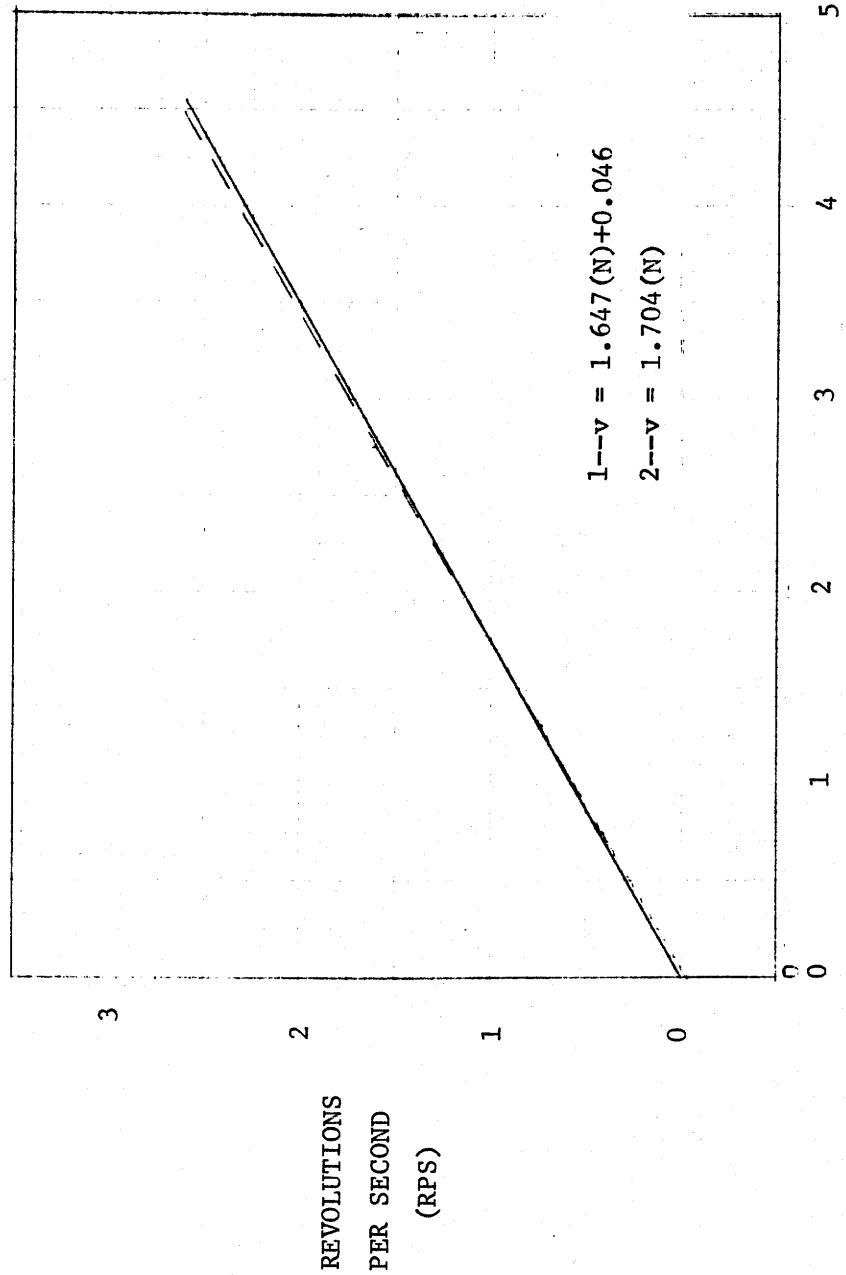
$N = .607V + 0.040$

$V = 1.6474(N) + 0.066$

$\%\ \text{Difference} = \frac{.607 - .587}{.607}$

$= 3.3\%$ between manufacturer's equation and laboratory measurement of velocity.

OTT METER CALIBRATION
(8/27)



```
      PROGRAM FLOW(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
*  PROGRAM TO COMPUTE STREAM FLOWS LINEARLY AND QUADRITICALLY
  3   DIMENSION X(50),D(50),VEL(50),DFV(50),VFV(50)
  3   DIMENSION OT1(50),OT2(50)
  3   DIMENSION LABEL(8)
  3   DIMENSION OT(50)
  3   DIMENSION FX(50)
  3   DATA LSTOP/10HSTOP      /
  3 2000  CONTINUE
  3   READ(5,68)  (LABEL(K),K=1,8)
 16 68    FORMAT(8A10)
*  READ NAME OF STREAM.................
 16   IF(LABEL(1).EQ.LSTOP) GO TO 3000
*    ............CHECK FOR STOP.................
 22   WRITE(6,67) (LABEL(K),K=1,8)
 35 67    FORMAT (///,1X,8A10)
*    ......IF NOT STOP, WRITE NAME............
 35   READ(5,1) XINT,RM,WIDTH
 47 1     FORMAT(3F10.0)
*  READ COMPUTATION INTERVAL, LOCATION AND WIDTH.....
 47   WRITE(6,3)RM,WIDTH
 57 3     FORMAT(* LOCATED AT RIVER MILE *,F5.1,*  WIDTH = *,F5.1,/)
*.....WRITE LOCATION AND WIDTH.....
 57   WRITE(6,6)
 63 6     FORMAT(1H ,3X,*DISTANCE OUT*,10X,*DEPTH*,* OTTMETER VAL 1*,* OTTME
     1TER VAL 2*,7X,*VELOCITY*,9X,*FLOW 1*,9X,*FLOW 2*,/,1H ,11X,*FEET*,
     211X,*FEET*,12X,*RPM*,7X,*FEET/SEC*,12X,*CFS*,12X,*CFS*)
*  ....AND WRITE HEADINGS....
 63   DO 7 I=1,50
 65 7     FX(I)=0.
 71   XTOT=0.0
 72   SUMF1=0.
 73   SUMF2=0.
 74   D(1)=0.
 77   DFV(1)=0.
102   VFV(1)=0.
104   IFLAG=0
105   J=1
106   N=0
*  INITIALIZE VARIABLES
107 1000  N=N+1
111   READ(5,10) X(N),D(N),OT1(N),OT2(N)
131 10    FORMAT(4F10.0)
*  READ DISTANCE ACROSS STREAM,DEPTH AND OTTMETER READINGS
131   OT(N)=(OT1(N)+OT2(N))/120.0
142   IF(OT(N).GE.0.51) GO TO 5
147   VEL(N)=1.5118*OT(N)+0.115
156   GO TO 4
156 5     VEL(N)=1.6466*OT(N)+0.046
165 4     CONTINUE
*  CONVERT THE OTTMETER READINGS TO STREAM VELOCITIES
165   VEL(1)=0.0
*  LEFT BANK VELOCITY SET TO ZERO
170   FX(N)=VEL(N)*D(N)
177   IF(N.EQ.1) GO TO 1000
```

```
202         SLD=(D(N)-D(N-1))/(X(N)-X(N-1))
220         SLV=(VEL(N)-VEL(N-1))/(X(N)-X(N-1))
      * COMPUTE DEPTH AND VELOCITY FUNCTION SLOPES
235         DFV(1)=DFV(J)
241         VFV(1)=VFV(J)
246         NJ=INT((X(N)-X(N-1))/XINT+.5)+1
      * COMPUTE THE NUMBER OF COMPUTATION INTERVALS UNTIL THE NEXT DATA POINT
264         DO 2 J=2,NJ
265          XTOT=XTOT+XINT
267         DFV(J)=DFV(J-1)+SLD*XINT
276         CSA=0.5*(DFV(J)+DFV(J-1))*XINT
307         VFV(J)=VFV(J-1)+SLV*XINT
316         VAV=(VFV(J)+VFV(J-1))/2.0
326         SUMF1=SUMF1+CSA*VAV
      * COMPUTE THE LINEAR FLOW
331   2     CONTINUE
333         T1=FLOAT((N-1)/2)
345         T2=(FLOAT(N-1))/2.
354         IF(T1.NE.T2) GO TO 11
      * TEST N FOR AN ODD NUMBER GREATER THAN 1
356   12    FI1=QUAD(X(N-2),X(N-1),X(N),X(N),X(N-2))
375         FI2=QUAD(X(N-1),X(N-2),X(N),X(N),X(N-2))
413         FI3=QUAD(X(N),X(N-1),X(N-2),X(N),X(N-2))
431         SUMF2=SUMF2+FX(N-2)*FI1+FX(N-1)*FI2+FX(N)*FI3
      * COMPUTE THE QUADRATIC FLOW
446         IF(IFLAG.EQ.1) GO TO 14
      * TEST FLAG TO SEE WHETHER AN EXTRA VALUE WAS ADDED ONTO THE LAST POINT
450         GO TO 13
451   11    IF(X(N).NE.WIDTH) GO TO 13
      * IS THIS EVEN NUMBERED POINT THE LAST POINT
456         X(N+1)=X(N)+1.
464         FX(N+1)=0.
      * IF SO, ADD AN EXTRA ZERO VALUE POINT
467         N=N+1
      *....SET FLAG....
471         IFLAG=1
472         GO TO 12
      * ....AND COMPUTE QUADRATIC FLOW
472   14    N=N-1
474         IFLAG=0
      * REMOVE EXTRA POINT AND RESET FLAG TO ZERO
475   13    CONTINUE
475         WRITE(6,20) X(N),D(N),DT1(N),DT2(N),VEL(N),SUMF1,SUMF2
524   20    FORMAT(1H ,7X,F8.1,7X,F8.2,7X,F8.1,7X,F8.1,7X,F8.3,7X,F8.2,7X,F8.2
           1)
524         IF(X(N).EQ.WIDTH) GO TO 3000
531         GO TO 1000
532   3000  CONTINUE
532         CALL EXIT
533         END
```

```
      FUNCTION QUAD(A,B,C,D,E)
    * FUNCTION CALLED FROM MAIN PROGRAM THAT FITS DATA POINTS QUADRATICALLY
 11     QUAD=((D**3/3.-((B+C)*D**2)/2.+B*C*D)-(E**3/3.-((B+C)*E**2)/2.+B*C
       1*E))/((A-B)*(A-C))
 60     RETURN
 60     END
```

SILK MILL RUN 7.25.74
LOCATED AT RIVER MILE 46.5 WIDTH = 10.0

DISTANCE OUT FEET	DEPTH FEET	OTTMETER VAL 1 RPM	OTTMETER VAL 2 FEET/SEC	VELOCITY CFS	FLOW 1 CFS	FLOW 2
5.0	.29	15.0	15.0	.437	.06	0.00
6.0	.33	12.0	12.0	.417	.03	.24
7.0	.50	16.0	16.0	.518	.11	.24
8.0	.33	15.0	15.0	.493	.19	.68
9.0	.33	18.0	18.0	.569	.24	.68
10.0	0.00	0.0	0.0	.115	.21	.99

```
****** 14.43.32.    FLOWSC7 000191 LINES PRINTED  /// END OF LIST ///   LO  23
****** 14.47.32.    FLOWSC7 000191 LINES PRINTED  /// END OF LIST ///   LO  23
```

APPENDIX E

Typical AUTOSS Computer Results

AUTOSS Computer Results for

1. CBOD
2. NBOD
3. DO
4. Total Coliforms
5. Hardness

```
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

**************************************************************************************************************************************
**************************************************************************************************************************************
          AAA            UUU         UUU     TTTTTTTTTTTTTTT        00000000000          SSSSSSSSSSSSS        SSSSSSSSSSSSS
         AAAAA           UUU         UUU     TTTTTTTTTTTTTTT      0000000000000        SSSSSSSSSSSSSS       SSSSSSSSSSSSSS
        AAAAAAA          UUU         UUU     TTTTTTTTTTTTTTT     000000000000000     SS                   SS
       AAA   AAA         UUU         UUU           TTT           000         000       SSSSSSSSSSSSS        SSSSSSSSSSSSS
      AAA     AAA        UUU         UUU           TTT           000         000         SSSSSSSSSSSS         SSSSSSSSSSSS
     AAA       AAA       UUU         UUU           TTT           000         000                  SSS                  SSS
    AAAAAAAAAAAAAAA      UUU         UUU           TTT           000         000                  SSS                  SSS
    AAAAAAAAAAAAAAA      UUUUUUUUUUUUUUU           TTT           000000000000000     SSSSSSSSSSSSSSS      SSSSSSSSSSSSSSS
    AAA         AAA        UUUUUUUUUUUUU           TTT             0000000000000     SSSSSSSSSSSSSS       SSSSSSSSSSSSSS
    AAA         AAA          UUUUUUUUUUU           TTT               00000000000     SSSSSSSSSSSSS        SSSSSSSSSSSSS
**************************************************************************************************************************************
**************************************************************************************************************************************
```

```
********************     STEADY STATE WATER QUALITY MODEL
********************
********************     RUN TITLE.....LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)
********************
********************
********************     BASIC NETWORK DATA
********************     RIVER MILE AT DOWNSTREAM END...      0.00
********************     RIVER MILE AT UPSTREAM END.....     46.50
********************     RIVER MILE OF FALL LINE........      0.00
********************     NUMBER OF SECTIONS.............       100
```

ESTUARY/STREAM INPUT DATA

CHANNEL WIDTHS (FT)

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	3.053E+02	26	11.86	3.472E+02	51	23.48	2.662E+02	76	35.11	3.043E+02
2	.70	2.960E+02	27	12.32	3.213E+02	52	23.95	2.337E+02	77	35.57	3.200E+02
3	1.16	2.949E+02	28	12.79	2.655E+02	53	24.41	3.001E+02	78	36.04	3.140E+02
4	1.63	3.088E+02	29	13.25	2.779E+02	54	24.88	3.792E+02	79	36.50	2.401E+02
5	2.09	3.043E+02	30	13.72	3.476E+02	55	25.34	3.315E+02	80	36.97	2.587E+02
6	2.56	2.252E+02	31	14.18	3.772E+02	56	25.81	3.020E+02	81	37.43	2.081E+02
7	3.02	2.287E+02	32	14.65	3.447E+02	57	26.27	3.051E+02	82	37.90	2.079E+02
8	3.49	5.000E+02	33	15.11	3.065E+02	58	26.74	3.082E+02	83	38.36	2.172E+02
9	3.95	5.000E+02	34	15.58	2.507E+02	59	27.20	3.039E+02	84	38.83	2.200E+02
10	4.42	4.541E+02	35	16.04	2.119E+02	60	27.67	2.900E+02	85	39.29	1.849E+02
11	4.88	4.029E+02	36	16.51	3.421E+02	61	28.13	3.303E+02	86	39.76	1.703E+02
12	5.35	3.448E+02	37	16.97	4.723E+02	62	28.60	4.700E+02	87	40.22	1.889E+02
13	5.81	2.844E+02	38	17.44	3.969E+02	63	29.06	4.700E+02	88	40.69	1.925E+02
14	6.28	2.711E+02	39	17.90	3.035E+02	64	29.53	4.623E+02	89	41.15	2.349E+02
15	6.74	2.897E+02	40	18.37	3.010E+02	65	29.99	3.321E+02	90	41.62	3.295E+02
16	7.21	2.938E+02	41	18.83	3.150E+02	66	30.46	2.385E+02	91	42.08	2.152E+02
17	7.67	2.798E+02	42	19.30	2.635E+02	67	30.92	2.553E+02	92	42.55	1.391E+02
18	8.14	2.714E+02	43	19.76	1.751E+02	68	31.39	2.058E+02	93	43.01	1.317E+02
19	8.60	2.760E+02	44	20.23	1.459E+02	69	31.85	2.957E+02	94	43.48	1.968E+02
20	9.07	2.901E+02	45	20.69	1.785E+02	70	32.32	3.527E+02	95	43.94	1.823E+02
21	9.53	3.599E+02	46	21.16	2.189E+02	71	32.78	3.500E+02	96	44.41	1.719E+02
22	10.00	4.296E+02	47	21.62	2.747E+02	72	33.25	3.254E+02	97	44.87	2.668E+02
23	10.46	3.560E+02	48	22.09	3.183E+02	73	33.71	2.773E+02	98	45.34	2.055E+02
24	10.93	2.816E+02	49	22.55	3.090E+02	74	34.18	2.671E+02	99	45.80	1.721E+02
25	11.39	3.053E+02	50	23.02	2.988E+02	75	34.64	2.857E+02	100	46.27	1.533E+02

JUNCTION SURFACE AREAS (SQFT)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	7.504E+05	27	12.09	8.214E+05	52	23.71	6.143E+05	77	35.34	7.671E+05
2	.46	7.390E+05	28	12.55	7.210E+05	53	24.18	6.559E+05	78	35.80	7.790E+05
3	.93	7.261E+05	29	13.02	6.677E+05	54	24.64	8.347E+05	79	36.27	6.809E+05
4	1.39	7.418E+05	30	13.48	7.686E+05	55	25.11	8.733E+05	80	36.73	6.129E+05
5	1.86	7.534E+05	31	13.95	8.907E+05	56	25.57	7.785E+05	81	37.20	5.736E+05
6	2.32	6.506E+05	32	14.41	8.870E+05	57	26.04	7.461E+05	82	37.66	5.112E+05
7	2.79	5.578E+05	33	14.88	8.001E+05	58	26.50	7.537E+05	83	38.13	5.225E+05
8	3.25	8.955E+05	34	15.34	6.847E+05	59	26.97	7.522E+05	84	38.59	5.373E+05
9	3.72	1.229E+06	35	15.81	5.684E+05	60	27.43	7.298E+05	85	39.06	4.975E+05
10	4.18	1.172E+06	36	16.27	6.807E+05	61	27.90	7.622E+05	86	39.52	4.365E+05
11	4.65	1.053E+06	37	16.74	1.001E+06	62	28.36	9.834E+05	87	39.99	4.414E+05
12	5.11	9.188E+05	38	17.20	1.068E+06	63	28.83	1.155E+06	88	40.45	4.687E+05
13	5.58	7.731E+05	39	17.67	8.668E+05	64	29.29	1.146E+06	89	40.92	5.252E+05
14	6.04	6.825E+05	40	18.13	7.490E+05	65	29.76	9.761E+05	90	41.38	6.935E+05
15	6.51	6.891E+05	41	18.60	7.569E+05	66	30.22	7.011E+05	91	41.85	6.692E+05
16	6.97	7.170E+05	42	19.06	7.108E+05	67	30.69	6.058E+05	92	42.31	4.352E+05
17	7.44	7.048E+05	43	19.53	5.389E+05	68	31.15	5.666E+05	93	42.78	3.327E+05
18	7.90	6.773E+05	44	19.99	3.945E+05	69	31.62	6.162E+05	94	43.24	4.038E+05
19	8.37	6.726E+05	45	20.46	3.986E+05	70	32.08	7.968E+05	95	43.71	4.659E+05
20	8.83	6.957E+05	46	20.92	4.883E+05	71	32.55	8.757E+05	96	44.17	4.352E+05
21	9.30	7.987E+05	47	21.39	6.055E+05	72	33.01	8.421E+05	97	44.64	5.391E+05
22	9.76	9.701E+05	48	21.85	7.286E+05	73	33.48	7.405E+05	98	45.10	5.804E+05
23	10.23	9.653E+05	49	22.32	7.707E+05	74	33.94	6.589E+05	99	45.57	4.640E+05
24	10.69	7.835E+05	50	22.78	7.467E+05	75	34.41	6.793E+05	100	46.03	3.998E+05
25	11.16	7.212E+05	51	23.25	6.943E+05	76	34.87	7.250E+05	101	46.50	3.766E+05
26	11.62	8.018E+05									

********** A3 COEFFICIENT FOR FLOW EQUATION - REPRESENTS DEPTH OF FLOW IF A1 AND/OR A2 ARE **********
********** NOT SPECIFIED (OR ARE ZERO) **********

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	1.074E+01	26	11.86	4.529E+00	51	23.48	2.531E+00	76	35.11	5.722E+00
2	.70	1.023E+01	27	12.32	4.822E+00	52	23.95	3.042E+00	77	35.57	6.726E+00
3	1.16	9.006E+00	28	12.79	5.287E+00	53	24.41	2.234E+00	78	36.04	5.700E+00
4	1.63	6.449E+00	29	13.25	4.339E+00	54	24.88	1.257E+00	79	36.50	5.700E+00
5	2.09	4.335E+00	30	13.72	2.200E+00	55	25.34	1.137E+00	80	36.97	5.607E+00
6	2.56	4.010E+00	31	14.18	1.557E+00	56	25.81	2.573E+00	81	37.43	5.859E+00
7	3.02	4.487E+00	32	14.65	3.231E+00	57	26.27	4.650E+00	82	37.90	7.331E+00
8	3.49	7.200E+00	33	15.11	4.702E+00	58	26.74	6.727E+00	83	38.36	9.005E+00
9	3.95	7.200E+00	34	15.58	5.539E+00	59	27.20	7.434E+00	84	38.83	5.439E+00
10	4.42	7.033E+00	35	16.04	6.304E+00	60	27.67	6.365E+00	85	39.29	3.709E+00
11	4.88	6.847E+00	36	16.51	6.351E+00	61	28.13	5.997E+00	86	39.76	4.077E+00
12	5.35	7.495E+00	37	16.97	6.397E+00	62	28.60	6.993E+00	87	40.22	4.217E+00
13	5.81	8.425E+00	38	17.44	6.356E+00	63	29.06	6.481E+00	88	40.69	3.250E+00
14	6.28	7.635E+00	39	17.90	6.310E+00	64	29.53	5.995E+00	89	41.15	1.683E+00
15	6.74	5.682E+00	40	18.37	4.793E+00	65	29.99	5.902E+00	90	41.62	2.241E+00
16	7.21	5.222E+00	41	18.83	2.887E+00	66	30.46	7.181E+00	91	42.08	2.618E+00
17	7.67	6.617E+00	42	19.30	2.141E+00	67	30.92	5.357E+00	92	42.55	2.276E+00
18	8.14	7.710E+00	43	19.76	2.048E+00	68	31.39	4.458E+00	93	43.01	2.985E+00
19	8.60	8.082E+00	44	20.23	1.886E+00	69	31.85	2.820E+00	94	43.48	2.427E+00
20	9.07	7.921E+00	45	20.69	1.654E+00	70	32.32	3.025E+00	95	43.94	2.488E+00
21	9.53	4.619E+00	46	21.16	2.177E+00	71	32.78	3.218E+00	96	44.41	2.663E+00
22	10.00	1.318E+00	47	21.62	4.177E+00	72	33.25	3.495E+00	97	44.87	1.732E+00
23	10.46	2.872E+00	48	22.09	5.468E+00	73	33.71	3.320E+00	98	45.34	1.535E+00
24	10.93	4.453E+00	49	22.55	3.701E+00	74	34.18	2.932E+00	99	45.80	1.419E+00
25	11.39	4.622E+00	50	23.02	2.019E+00	75	34.64	4.327E+00	100	46.27	2.798E+00

********** JUNCTION WATER TEMPERATURES (DEG-C) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	2.650E+01	27	12.09	2.349E+01	52	23.71	2.258E+01	77	35.34	2.256E+01
2	.46	2.650E+01	28	12.55	2.353E+01	53	24.18	2.276E+01	78	35.80	2.269E+01
3	.93	2.650E+01	29	13.02	2.355E+01	54	24.64	2.294E+01	79	36.27	2.281E+01
4	1.39	2.650E+01	30	13.48	2.358E+01	55	25.11	2.312E+01	80	36.73	2.293E+01
5	1.86	2.650E+01	31	13.95	2.361E+01	56	25.57	2.330E+01	81	37.20	2.290E+01
6	2.32	2.650E+01	32	14.41	2.364E+01	57	26.04	2.348E+01	82	37.66	2.244E+01
7	2.79	2.650E+01	33	14.88	2.367E+01	58	26.50	2.350E+01	83	38.13	2.197E+01
8	3.25	2.649E+01	34	15.34	2.369E+01	59	26.97	2.350E+01	84	38.59	2.151E+01
9	3.72	2.645E+01	35	15.81	2.372E+01	60	27.43	2.350E+01	85	39.06	2.104E+01
10	4.18	2.642E+01	36	16.27	2.375E+01	61	27.90	2.350E+01	86	39.52	2.067E+01
11	4.65	2.638E+01	37	16.74	2.378E+01	62	28.36	2.350E+01	87	39.99	2.032E+01
12	5.11	2.634E+01	38	17.20	2.380E+01	63	28.83	2.346E+01	88	40.45	2.000E+01
13	5.58	2.631E+01	39	17.67	2.383E+01	64	29.29	2.341E+01	89	40.92	2.000E+01
14	6.04	2.627E+01	40	18.13	2.386E+01	65	29.76	2.336E+01	90	41.38	2.000E+01
15	6.51	2.623E+01	41	18.60	2.389E+01	66	30.22	2.331E+01	91	41.85	2.000E+01
16	6.97	2.620E+01	42	19.06	2.391E+01	67	30.69	2.326E+01	92	42.31	2.000E+01
17	7.44	2.616E+01	43	19.53	2.394E+01	68	31.15	2.321E+01	93	42.78	2.000E+01
18	7.90	2.612E+01	44	19.99	2.397E+01	69	31.62	2.315E+01	94	43.24	2.000E+01
19	8.37	2.609E+01	45	20.46	2.400E+01	70	32.08	2.310E+01	95	43.71	2.000E+01
20	8.83	2.605E+01	46	20.92	2.370E+01	71	32.55	2.305E+01	96	44.17	2.000E+01
21	9.30	2.602E+01	47	21.39	2.341E+01	72	33.01	2.300E+01	97	44.64	2.000E+01
22	9.76	2.564E+01	48	21.85	2.320E+01	73	33.48	2.289E+01	98	45.10	2.000E+01
23	10.23	2.500E+01	49	22.32	2.299E+01	74	33.94	2.278E+01	99	45.57	2.000E+01
24	10.69	2.434E+01	50	22.78	2.280E+01	75	34.41	2.266E+01	100	46.03	2.000E+01
25	11.16	2.357E+01	51	23.25	2.260E+01	76	34.87	2.255E+01	101	46.50	2.000E+01
26	11.62	2.310E+01									

********** INPUT REAERATION RATES CORRECTED TO STREAM TEMPS - (1/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	2.333E+00	27	12.09	4.476E+00	52	23.71	7.889E+00	77	35.34	2.835E+00
2	.46	4.029E+00	28	12.55	4.993E+00	53	24.18	4.570E+00	78	35.80	2.943E+00
3	.93	5.724E+00	29	13.02	5.509E+00	54	24.64	5.365E+00	79	36.27	3.051E+00
4	1.39	7.419E+00	30	13.48	6.026E+00	55	25.11	6.166E+00	80	36.73	3.159E+00
5	1.86	9.115E+00	31	13.95	6.544E+00	56	25.57	6.975E+00	81	37.20	2.657E+00
6	2.32	1.081E+01	32	14.41	7.063E+00	57	26.04	7.790E+00	82	37.66	1.347E+00
7	2.79	1.251E+01	33	14.88	7.582E+00	58	26.50	8.580E+00	83	38.13	5.521E-01
8	3.25	1.251E+01	34	15.34	8.102E+00	59	26.97	9.366E+00	84	38.59	1.017E+00
9	3.72	4.671E-01	35	15.81	8.622E+00	60	27.43	1.015E+01	85	39.06	1.471E+00
10	4.18	4.903E-01	36	16.27	9.144E+00	61	27.90	1.094E+01	86	39.52	1.920E+00
11	4.65	5.134E-01	37	16.74	9.666E+00	62	28.36	1.172E+01	87	39.99	2.361E+00
12	5.11	5.364E-01	38	17.20	9.403E-01	63	28.83	5.517E-01	88	40.45	2.797E+00
13	5.58	5.595E-01	39	17.67	2.082E+00	64	29.29	7.883E-01	89	40.92	3.251E+00
14	6.04	6.115E-01	40	18.13	3.224E+00	65	29.76	1.024E+00	90	41.38	3.705E+00
15	6.51	9.314E-01	41	18.60	4.369E+00	66	30.22	1.260E+00	91	41.85	4.159E+00
16	6.97	1.115E+00	42	19.06	5.515E+00	67	30.69	1.495E+00	92	42.31	4.613E+00
17	7.44	1.299E+00	43	19.53	6.697E+00	68	31.15	1.729E+00	93	42.78	5.068E+00
18	7.90	1.482E+00	44	19.99	8.387E+00	69	31.62	1.963E+00	94	43.24	5.522E+00
19	8.37	1.665E+00	45	20.46	1.008E+01	70	32.08	2.171E+00	95	43.71	5.976E+00
20	8.83	1.848E+00	46	20.92	1.026E+01	71	32.55	2.268E+00	96	44.17	6.430E+00
21	9.30	2.030E+00	47	21.39	1.031E+01	72	33.01	2.365E+00	97	44.64	6.884E+00
22	9.76	2.194E+00	48	21.85	1.037E+01	73	33.48	2.459E+00	98	45.10	7.338E+00
23	10.23	2.515E+00	49	22.32	1.044E+01	74	33.94	2.552E+00	99	45.57	7.792E+00
24	10.69	2.998E+00	50	22.78	1.051E+01	75	34.41	2.644E+00	100	46.03	8.246E+00
25	11.16	3.457E+00	51	23.25	1.058E+01	76	34.87	2.736E+00	101	46.50	8.700E+00
26	11.62	3.927E+00									

********** CBOD DECAY RATES CORRECTED TO STREAM TEMPS - (1/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	3.100E-01	27	12.09	2.700E-01	52	23.71	2.590E-01	77	35.34	2.587E-01
2	.46	3.100E-01	28	12.55	2.704E-01	53	24.18	2.611E-01	78	35.80	2.602E-01
3	.93	3.100E-01	29	13.02	2.708E-01	54	24.64	2.633E-01	79	36.27	2.617E-01
4	1.39	3.100E-01	30	13.48	2.711E-01	55	25.11	2.654E-01	80	36.73	2.631E-01
5	1.86	3.100E-01	31	13.95	2.715E-01	56	25.57	2.676E-01	81	37.20	2.628E-01
6	2.32	3.100E-01	32	14.41	2.718E-01	57	26.04	2.698E-01	82	37.66	2.572E-01
7	2.79	3.100E-01	33	14.88	2.722E-01	58	26.50	2.701E-01	83	38.13	2.518E-01
8	3.25	3.098E-01	34	15.34	2.725E-01	59	26.97	2.701E-01	84	38.59	2.465E-01
9	3.72	3.093E-01	35	15.81	2.729E-01	60	27.43	2.701E-01	85	39.06	2.413E-01
10	4.18	3.088E-01	36	16.27	2.732E-01	61	27.90	2.701E-01	86	39.52	2.372E-01
11	4.65	3.083E-01	37	16.74	2.736E-01	62	28.36	2.701E-01	87	39.99	2.334E-01
12	5.11	3.078E-01	38	17.20	2.739E-01	63	28.83	2.697E-01	88	40.45	2.300E-01
13	5.58	3.073E-01	39	17.67	2.743E-01	64	29.29	2.690E-01	89	40.92	2.300E-01
14	6.04	3.068E-01	40	18.13	2.746E-01	65	29.76	2.684E-01	90	41.38	2.300E-01
15	6.51	3.062E-01	41	18.60	2.750E-01	66	30.22	2.677E-01	91	41.85	2.300E-01
16	6.97	3.057E-01	42	19.06	2.753E-01	67	30.69	2.671E-01	92	42.31	2.300E-01
17	7.44	3.052E-01	43	19.53	2.757E-01	68	31.15	2.665E-01	93	42.78	2.300E-01
18	7.90	3.047E-01	44	19.99	2.760E-01	69	31.62	2.658E-01	94	43.24	2.300E-01
19	8.37	3.042E-01	45	20.46	2.764E-01	70	32.08	2.652E-01	95	43.71	2.300E-01
20	8.83	3.037E-01	46	20.92	2.726E-01	71	32.55	2.646E-01	96	44.17	2.300E-01
21	9.30	3.032E-01	47	21.39	2.690E-01	72	33.01	2.639E-01	97	44.64	2.300E-01
22	9.76	2.980E-01	48	21.85	2.664E-01	73	33.48	2.626E-01	98	45.10	2.300E-01
23	10.23	2.894E-01	49	22.32	2.639E-01	74	33.94	2.613E-01	99	45.57	2.300E-01
24	10.69	2.808E-01	50	22.78	2.615E-01	75	34.41	2.599E-01	100	46.03	2.300E-01
25	11.16	2.709E-01	51	23.25	2.592E-01	76	34.87	2.586E-01	101	46.50	2.300E-01
26	11.62	2.652E-01									

********** NBOD DECAY RATES CORRECTED TO STREAM TEMPS - (1/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	1.102E-01	27	12.09	1.053E-01	52	23.71	0.	77	35.34	0.
2	.46	1.102E-01	28	12.55	1.054E-01	53	24.18	0.	78	35.80	0.
3	.93	1.102E-01	29	13.02	1.054E-01	54	24.64	0.	79	36.27	0.
4	1.39	1.102E-01	30	13.48	1.055E-01	55	25.11	0.	80	36.73	0.
5	1.86	1.102E-01	31	13.95	1.055E-01	56	25.57	0.	81	37.20	0.
6	2.32	1.102E-01	32	14.41	1.056E-01	57	26.04	0.	82	37.66	0.
7	2.79	1.102E-01	33	14.88	1.056E-01	58	26.50	0.	83	38.13	0.
8	3.25	1.955E-01	34	15.34	1.057E-01	59	26.97	0.	84	38.59	0.
9	3.72	3.302E-01	35	15.81	1.057E-01	60	27.43	0.	85	39.06	0.
10	4.18	3.301E-01	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	3.299E-01	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	3.297E-01	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	3.295E-01	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	3.294E-01	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	3.292E-01	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	3.290E-01	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	3.288E-01	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	3.286E-01	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	3.285E-01	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	3.283E-01	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	1.969E-01	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	1.088E-01	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	1.077E-01	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	1.067E-01	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	1.055E-01	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	1.047E-01									

********** COLIFORM DECAY RATES (1/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	3.522E-01	27	12.09	3.270E-01	52	23.71	3.198E-01	77	35.34	3.196E-01
2	.46	3.522E-01	28	12.55	3.273E-01	53	24.18	3.212E-01	78	35.80	3.206E-01
3	.93	3.522E-01	29	13.02	3.275E-01	54	24.64	3.226E-01	79	36.27	3.215E-01
4	1.39	3.522E-01	30	13.48	3.277E-01	55	25.11	3.240E-01	80	36.73	3.225E-01
5	1.86	3.522E-01	31	13.95	3.280E-01	56	25.57	3.255E-01	81	37.20	3.223E-01
6	2.32	3.522E-01	32	14.41	3.282E-01	57	26.04	3.269E-01	82	37.66	3.186E-01
7	2.79	3.522E-01	33	14.88	3.284E-01	58	26.50	3.271E-01	83	38.13	3.150E-01
8	3.25	3.521E-01	34	15.34	3.286E-01	59	26.97	3.271E-01	84	38.59	3.114E-01
9	3.72	3.518E-01	35	15.81	3.289E-01	60	27.43	3.271E-01	85	39.06	3.078E-01
10	4.18	3.515E-01	36	16.27	3.291E-01	61	27.90	3.271E-01	86	39.52	3.050E-01
11	4.65	3.512E-01	37	16.74	3.293E-01	62	28.36	3.271E-01	87	39.99	3.023E-01
12	5.11	3.509E-01	38	17.20	3.295E-01	63	28.83	3.268E-01	88	40.45	3.000E-01
13	5.58	3.505E-01	39	17.67	3.298E-01	64	29.29	3.264E-01	89	40.92	3.000E-01
14	6.04	3.502E-01	40	18.13	3.300E-01	65	29.76	3.260E-01	90	41.38	3.000E-01
15	6.51	3.499E-01	41	18.60	3.302E-01	66	30.22	3.255E-01	91	41.85	3.000E-01
16	6.97	3.496E-01	42	19.06	3.304E-01	67	30.69	3.251E-01	92	42.31	3.000E-01
17	7.44	3.493E-01	43	19.53	3.307E-01	68	31.15	3.247E-01	93	42.78	3.000E-01
18	7.90	3.490E-01	44	19.99	3.309E-01	69	31.62	3.243E-01	94	43.24	3.000E-01
19	8.37	3.487E-01	45	20.46	3.311E-01	70	32.08	3.239E-01	95	43.71	3.000E-01
20	8.83	3.484E-01	46	20.92	3.287E-01	71	32.55	3.235E-01	96	44.17	3.000E-01
21	9.30	3.480E-01	47	21.39	3.264E-01	72	33.01	3.230E-01	97	44.64	3.000E-01
22	9.76	3.448E-01	48	21.85	3.247E-01	73	33.48	3.222E-01	98	45.10	3.000E-01
23	10.23	3.395E-01	49	22.32	3.230E-01	74	33.94	3.213E-01	99	45.57	3.000E-01
24	10.69	3.339E-01	50	22.78	3.215E-01	75	34.41	3.204E-01	100	46.03	3.000E-01
25	11.16	3.276E-01	51	23.25	3.199E-01	76	34.87	3.195E-01	101	46.50	3.000E-01
26	11.62	3.239E-01									

********** COMPUTED OXYGEN SATURATION CONCENTRATIONS (PPM) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	8.055E+00	27	12.09	8.482E+00	52	23.71	8.627E+00	77	35.34	8.630E+00
2	.46	8.055E+00	28	12.55	8.476E+00	53	24.18	8.598E+00	78	35.80	8.610E+00
3	.93	8.055E+00	29	13.02	8.472E+00	54	24.64	8.569E+00	79	36.27	8.590E+00
4	1.39	8.055E+00	30	13.48	8.468E+00	55	25.11	8.540E+00	80	36.73	8.571E+00
5	1.86	8.055E+00	31	13.95	8.464E+00	56	25.57	8.512E+00	81	37.20	8.576E+00
6	2.32	8.055E+00	32	14.41	8.459E+00	57	26.04	8.484E+00	82	37.66	8.651E+00
7	2.79	8.055E+00	33	14.88	8.455E+00	58	26.50	8.481E+00	83	38.13	8.729E+00
8	3.25	8.056E+00	34	15.34	8.451E+00	59	26.97	8.481E+00	84	38.59	8.809E+00
9	3.72	8.061E+00	35	15.81	8.447E+00	60	27.43	8.481E+00	85	39.06	8.890E+00
10	4.18	8.066E+00	36	16.27	8.442E+00	61	27.90	8.481E+00	86	39.52	8.956E+00
11	4.65	8.070E+00	37	16.74	8.438E+00	62	28.36	8.481E+00	87	39.99	9.021E+00
12	5.11	8.075E+00	38	17.20	8.434E+00	63	28.83	8.486E+00	88	40.45	9.080E+00
13	5.58	8.080E+00	39	17.67	8.430E+00	64	29.29	8.494E+00	89	40.92	9.080E+00
14	6.04	8.084E+00	40	18.13	8.425E+00	65	29.76	8.502E+00	90	41.38	9.080E+00
15	6.51	8.089E+00	41	18.60	8.421E+00	66	30.22	8.511E+00	91	41.85	9.080E+00
16	6.97	8.094E+00	42	19.06	8.417E+00	67	30.69	8.519E+00	92	42.31	9.080E+00
17	7.44	8.099E+00	43	19.53	8.413E+00	68	31.15	8.527E+00	93	42.78	9.080E+00
18	7.90	8.103E+00	44	19.99	8.409E+00	69	31.62	8.535E+00	94	43.24	9.080E+00
19	8.37	8.108E+00	45	20.46	8.404E+00	70	32.08	8.543E+00	95	43.71	9.080E+00
20	8.83	8.113E+00	46	20.92	8.450E+00	71	32.55	8.552E+00	96	44.17	9.080E+00
21	9.30	8.118E+00	47	21.39	8.494E+00	72	33.01	8.560E+00	97	44.64	9.080E+00
22	9.76	8.169E+00	48	21.85	8.527E+00	73	33.48	8.578E+00	98	45.10	9.080E+00
23	10.23	8.257E+00	49	22.32	8.561E+00	74	33.94	8.596E+00	99	45.57	9.080E+00
24	10.69	8.353E+00	50	22.78	8.592E+00	75	34.41	8.614E+00	100	46.03	9.080E+00
25	11.16	8.470E+00	51	23.25	8.624E+00	76	34.87	8.632E+00	101	46.50	9.080E+00
26	11.62	8.543E+00									

********** DEPTH OR VELOCITY DEPENDENT VARIABLES **********

********** CROSS-SECTIONAL AREAS OF CHANNELS (SQFT) **********

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	3.281E+03	26	11.86	1.572E+03	51	23.48	6.737E+02	76	35.11	1.741E+03
2	.70	3.029E+03	27	12.32	1.549E+03	52	23.95	7.109E+02	77	35.57	2.152E+03
3	1.16	2.656E+03	28	12.79	1.404E+03	53	24.41	6.704E+02	78	36.04	1.790E+03
4	1.63	1.992E+03	29	13.25	1.206E+03	54	24.88	4.767E+02	79	36.50	1.368E+03
5	2.09	1.319E+03	30	13.72	7.646E+02	55	25.34	3.769E+02	80	36.97	1.450E+03
6	2.56	9.031E+02	31	14.18	5.873E+02	56	25.81	7.773E+02	81	37.43	1.219E+03
7	3.02	1.027E+03	32	14.65	1.114E+03	57	26.27	1.419E+03	82	37.90	1.524E+03
8	3.49	3.600E+03	33	15.11	1.441E+03	58	26.74	2.074E+03	83	38.36	1.956E+03
9	3.95	3.600E+03	34	15.58	1.389E+03	59	27.20	2.259E+03	84	38.83	1.197E+03
10	4.42	3.194E+03	35	16.04	1.336E+03	60	27.67	1.846E+03	85	39.29	6.859E+02
11	4.88	2.759E+03	36	16.51	2.173E+03	61	28.13	1.981E+03	86	39.76	6.944E+02
12	5.35	2.584E+03	37	16.97	3.021E+03	62	28.60	3.287E+03	87	40.22	7.965E+02
13	5.81	2.396E+03	38	17.44	2.523E+03	63	29.06	3.046E+03	88	40.69	6.256E+02
14	6.28	2.070E+03	39	17.90	1.947E+03	64	29.53	2.771E+03	89	41.15	3.953E+02
15	6.74	1.646E+03	40	18.37	1.443E+03	65	29.99	1.960E+03	90	41.62	7.383E+02
16	7.21	1.534E+03	41	18.83	9.093E+02	66	30.46	1.713E+03	91	42.08	5.632E+02
17	7.67	1.852E+03	42	19.30	5.640E+02	67	30.92	1.368E+03	92	42.55	3.165E+02
18	8.14	2.092E+03	43	19.76	3.586E+02	68	31.39	9.171E+02	93	43.01	3.933E+02
19	8.60	2.231E+03	44	20.23	2.753E+02	69	31.85	8.339E+02	94	43.48	4.778E+02
20	9.07	2.298E+03	45	20.69	2.952E+02	70	32.32	1.067E+03	95	43.94	4.537E+02
21	9.53	1.662E+03	46	21.16	4.766E+02	71	32.78	1.158E+03	96	44.41	4.576E+02
22	10.00	5.661E+02	47	21.62	1.147E+03	72	33.25	1.137E+03	97	44.87	4.621E+02
23	10.46	1.023E+03	48	22.09	1.740E+03	73	33.71	9.205E+02	98	45.34	3.154E+02
24	10.93	1.254E+03	49	22.55	1.143E+03	74	34.18	7.833E+02	99	45.80	2.441E+02
25	11.39	1.411E+03	50	23.02	6.033E+02	75	34.64	1.236E+03	100	46.27	4.288E+02

********** CHANNEL DEPTHS (FT) **********

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	1.074E+01	26	11.86	4.529E+00	51	23.48	2.531E+00	76	35.11	5.722E+00
2	.70	1.023E+01	27	12.32	4.822E+00	52	23.95	3.042E+00	77	35.57	6.726E+00
3	1.16	9.006E+00	28	12.79	5.287E+00	53	24.41	2.234E+00	78	36.04	5.700E+00
4	1.63	6.449E+00	29	13.25	4.339E+00	54	24.88	1.257E+00	79	36.50	5.700E+00
5	2.09	4.335E+00	30	13.72	2.200E+00	55	25.34	1.137E+00	80	36.97	5.607E+00
6	2.56	4.010E+00	31	14.18	1.557E+00	56	25.81	2.573E+00	81	37.43	5.859E+00
7	3.02	4.487E+00	32	14.65	3.231E+00	57	26.27	4.650E+00	82	37.90	7.331E+00
8	3.49	7.200E+00	33	15.11	4.702E+00	58	26.74	6.727E+00	83	38.36	9.005E+00
9	3.95	7.200E+00	34	15.58	5.539E+00	59	27.20	7.434E+00	84	38.83	5.439E+00
10	4.42	7.033E+00	35	16.04	6.304E+00	60	27.67	6.365E+00	85	39.29	3.709E+00
11	4.88	6.847E+00	36	16.51	6.351E+00	61	28.13	5.997E+00	86	39.76	4.077E+00
12	5.35	7.495E+00	37	16.97	6.397E+00	62	28.60	6.993E+00	87	40.22	4.217E+00
13	5.81	8.425E+00	38	17.44	6.356E+00	63	29.06	6.481E+00	88	40.69	3.250E+00
14	6.28	7.635E+00	39	17.90	6.310E+00	64	29.53	5.995E+00	89	41.15	1.683E+00
15	6.74	5.682E+00	40	18.37	4.793E+00	65	29.99	5.902E+00	90	41.62	2.241E+00
16	7.21	5.222E+00	41	18.83	2.887E+00	66	30.46	7.181E+00	91	42.08	2.618E+00
17	7.67	6.617E+00	42	19.30	2.141E+00	67	30.92	5.357E+00	92	42.55	2.276E+00
18	8.14	7.710E+00	43	19.76	2.048E+00	68	31.39	4.458E+00	93	43.01	2.985E+00
19	8.60	8.082E+00	44	20.23	1.886E+00	69	31.85	2.820E+00	94	43.48	2.427E+00
20	9.07	7.921E+00	45	20.69	1.654E+00	70	32.32	3.025E+00	95	43.94	2.488E+00
21	9.53	4.619E+00	46	21.16	2.177E+00	71	32.78	3.218E+00	96	44.41	2.663E+00
22	10.00	1.318E+00	47	21.62	4.177E+00	72	33.25	3.495E+00	97	44.87	1.732E+00
23	10.46	2.872E+00	48	22.09	5.468E+00	73	33.71	3.320E+00	98	45.34	1.535E+00
24	10.93	4.453E+00	49	22.55	3.701E+00	74	34.18	2.932E+00	99	45.80	1.419E+00
25	11.39	4.522E+00	50	23.02	2.019E+00	75	34.64	4.327E+00	100	46.27	2.798E+00

********** CHANNEL VELOCITIES (FT/SEC) **********

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	3.122E-01	26	11.86	5.274E-01	51	23.48	8.942E-01	76	35.11	3.378E-01
2	.70	3.391E-01	27	12.32	5.351E-01	52	23.95	8.475E-01	77	35.57	2.733E-01
3	1.15	3.857E-01	28	12.79	5.906E-01	53	24.41	8.987E-01	78	36.04	2.891E-01
4	1.63	5.141E-01	29	13.25	6.877E-01	54	24.88	1.268E+00	79	36.50	3.781E-01
5	2.09	7.761E-01	30	13.72	1.084E+00	55	25.34	1.603E+00	80	36.97	3.567E-01
6	2.56	1.134E+00	31	14.18	1.412E+00	56	25.81	7.775E-01	81	37.43	4.241E-01
7	3.02	9.974E-01	32	14.65	7.444E-01	57	26.27	4.252E-01	82	37.90	3.392E-01
8	3.49	2.844E-01	33	15.11	5.752E-01	58	26.74	2.910E-01	83	38.36	2.643E-01
9	3.95	2.844E-01	34	15.58	5.970E-01	59	27.20	2.671E-01	84	38.83	4.321E-01
10	4.42	3.205E-01	35	16.04	6.206E-01	60	27.67	3.269E-01	85	39.29	7.052E-01
11	4.88	3.709E-01	36	16.51	2.991E-01	61	28.13	3.046E-01	86	39.76	6.966E-01
12	5.35	3.960E-01	37	16.97	2.151E-01	62	28.60	1.936E-01	87	40.22	6.073E-01
13	5.81	4.271E-01	38	17.44	2.576E-01	63	29.06	1.981E-01	88	40.69	6.725E-01
14	6.28	4.945E-01	39	17.90	3.338E-01	64	29.53	2.175E-01	89	41.15	1.064E+00
15	6.74	6.218E-01	40	18.37	4.479E-01	65	29.99	3.076E-01	90	41.62	5.699E-01
16	7.21	6.670E-01	41	18.83	7.108E-01	66	30.46	3.520E-01	91	42.08	7.471E-01
17	7.67	5.527E-01	42	19.30	1.146E+00	67	30.92	4.381E-01	92	42.55	1.280E+00
18	8.14	4.891E-01	43	19.76	1.799E+00	68	31.39	6.534E-01	93	43.01	1.030E+00
19	8.60	4.549E-01	44	20.23	2.304E+00	69	31.85	7.187E-01	94	43.48	8.477E-01
20	9.07	4.416E-01	45	20.69	2.148E+00	70	32.32	5.616E-01	95	43.94	8.928E-01
21	9.53	5.551E-01	46	21.16	1.309E+00	71	32.78	5.174E-01	96	44.41	8.772E-01
22	10.00	1.618E+00	47	21.62	5.438E-01	72	33.25	5.181E-01	97	44.87	8.688E-01
23	10.46	9.490E-01	48	22.09	3.586E-01	73	33.71	6.400E-01	98	45.34	1.273E+00
24	10.93	7.906E-01	49	22.55	5.458E-01	74	34.18	7.521E-01	99	45.80	1.644E+00
25	11.39	5.920E-01	50	23.02	1.000E+00	75	34.64	4.765E-01	100	46.27	9.338E-01

********** JUNCTION VOLUMES (CUFT) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	8.063E+06	27	12.09	3.836E+06	52	23.71	1.701E+06	77	35.34	4.784E+06
2	.46	7.754E+06	28	12.55	3.629E+06	53	24.18	1.697E+06	78	35.80	4.844E+06
3	.93	6.986E+06	29	13.02	3.206E+06	54	24.64	1.410E+06	79	36.27	3.881E+06
4	1.39	5.710E+06	30	13.48	2.421E+06	55	25.11	1.049E+06	80	36.73	3.464E+06
5	1.86	4.068E+06	31	13.95	1.661E+06	56	25.57	1.418E+06	81	37.20	3.281E+06
6	2.32	2.731E+06	32	14.41	2.090E+06	57	26.04	2.699E+06	82	37.66	3.372E+06
7	2.79	2.371E+06	33	14.88	3.139E+06	58	26.50	4.292E+06	83	38.13	4.277E+06
8	3.25	5.685E+06	34	15.34	3.477E+06	59	26.97	5.324E+06	84	38.59	3.874E+06
9	3.72	8.847E+06	35	15.81	3.348E+06	60	27.43	5.044E+06	85	39.06	2.313E+06
10	4.18	8.348E+06	36	16.27	4.311E+06	61	27.90	4.702E+06	86	39.52	1.696E+06
11	4.65	7.314E+06	37	16.74	6.382E+06	62	28.36	6.473E+06	87	39.99	1.832E+06
12	5.11	6.566E+06	38	17.20	6.812E+06	63	28.83	7.781E+06	88	40.45	1.748E+06
13	5.58	6.120E+06	39	17.67	5.492E+06	64	29.29	7.148E+06	89	40.92	1.255E+06
14	6.04	5.487E+06	40	18.13	4.165E+06	65	29.76	5.813E+06	90	41.38	1.393E+06
15	6.51	4.566E+06	41	18.60	2.890E+06	66	30.22	4.513E+06	91	41.85	1.599E+06
16	6.97	3.908E+06	42	19.06	1.810E+06	67	30.69	3.785E+06	92	42.31	1.081E+06
17	7.44	4.161E+06	43	19.53	1.134E+06	68	31.15	2.808E+06	93	42.78	8.721E+05
18	7.90	4.846E+06	44	19.99	7.788E+05	69	31.62	2.152E+06	94	43.24	1.070E+06
19	8.37	5.312E+06	45	20.46	7.009E+05	70	32.08	2.336E+06	95	43.71	1.144E+06
20	8.83	5.565E+06	46	20.92	9.483E+05	71	32.55	2.734E+06	96	44.17	1.120E+06
21	9.30	4.866E+06	47	21.39	1.995E+06	72	33.01	2.820E+06	97	44.64	1.130E+06
22	9.76	2.738E+06	48	21.85	3.548E+06	73	33.48	2.528E+06	98	45.10	9.554E+05
23	10.23	1.952E+06	49	22.32	3.543E+06	74	33.94	2.093E+06	99	45.57	6.876E+05
24	10.69	2.798E+06	50	22.78	2.146E+06	75	34.41	2.482E+06	100	46.03	8.269E+05
25	11.16	3.275E+06	51	23.25	1.569E+06	76	34.87	3.659E+06	101	46.50	1.054E+06
26	11.62	3.666E+06									

STEADY STATE FLOW CONDITIONS

TOTAL INFLOWS = 1232.4 CFS
TOTAL DIVERSIONS = 208.2 CFS
OUTFLOW AT DOWNSTREAM JUNCTION = 1024.2 CFS

POINT SOURCE INFLOWS (CFS)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	1.000E-01	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	7.092E+01
3	.93	0.	29	13.02	0.	54	24.64	5.100E-01	79	36.27	0.
4	1.39	4.000E-01	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	3.000E-01
6	2.32	0.	32	14.41	0.	57	26.04	9.700E-01	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	2.000E-02	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	3.338E+01
10	4.18	4.000E-01	36	16.27	1.792E+02	61	27.90	0.	86	39.52	0.
11	4.65	2.000E-02	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	6.298E+01
13	5.58	0.	39	17.67	0.	64	29.29	5.000E-01	89	40.92	0.
14	6.04	0.	40	18.13	3.520E+00	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	3.620E+00	92	42.31	1.573E+01
17	7.44	0.	43	19.53	1.300E+00	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	1.098E+01	69	31.62	0.	94	43.24	0.
19	8.37	8.620E+00	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	1.008E+01	71	32.55	0.	96	44.17	3.580E+00
21	9.30	9.200E+01	47	21.39	0.	72	33.01	1.020E+01	97	44.64	0.
22	9.76	6.700E+00	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	8.280E+01	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	4.750E+01	50	22.78	2.049E+01	75	34.41	0.	100	46.03	1.000E+00
25	11.16	1.561E+02	51	23.25	1.000E+00	76	34.87	7.700E-01	101	46.50	4.004E+02
26	11.62	6.200E+00									

NONPOINT SOURCE INFLOWS (CFS) (EXCLUDING RAINFALL)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

POINT DIVERSIONS (CFS)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	1.024E+03	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	2.400E+00	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	1.372E+02	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	6.860E+01	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

NONPOINT DIVERSIONS OR LOSSES (CFS) (EXCLUDING EVAPORATION)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	-0.	27	12.09	-0.	52	23.71	-0.	77	35.34	-0.
2	.46	-0.	28	12.55	-0.	53	24.18	-0.	78	35.80	-0.
3	.93	-0.	29	13.02	-0.	54	24.64	-0.	79	36.27	-0.
4	1.39	-0.	30	13.48	-0.	55	25.11	-0.	80	36.73	-0.
5	1.86	-0.	31	13.95	-0.	56	25.57	-0.	81	37.20	-0.
6	2.32	-0.	32	14.41	-0.	57	26.04	-0.	82	37.66	-0.
7	2.79	-0.	33	14.88	-0.	58	26.50	-0.	83	38.13	-0.
8	3.25	-0.	34	15.34	-0.	59	26.97	-0.	84	38.59	-0.
9	3.72	-0.	35	15.81	-0.	60	27.43	-0.	85	39.06	-0.
10	4.18	-0.	36	16.27	-0.	61	27.90	-0.	86	39.52	-0.
11	4.65	-0.	37	16.74	-0.	62	28.36	-0.	87	39.99	-0.
12	5.11	-0.	38	17.20	-0.	63	28.83	-0.	88	40.45	-0.
13	5.58	-0.	39	17.67	-0.	64	29.29	-0.	89	40.92	-0.
14	6.04	-0.	40	18.13	-0.	65	29.76	-0.	90	41.38	-0.
15	6.51	-0.	41	18.60	-0.	66	30.22	-0.	91	41.85	-0.
16	6.97	-0.	42	19.06	-0.	67	30.69	-0.	92	42.31	-0.
17	7.44	-0.	43	19.53	-0.	68	31.15	-0.	93	42.78	-0.
18	7.90	-0.	44	19.99	-0.	69	31.62	-0.	94	43.24	-0.
19	8.37	-0.	45	20.46	-0.	70	32.08	-0.	95	43.71	-0.
20	8.83	-0.	46	20.92	-0.	71	32.55	-0.	96	44.17	-0.
21	9.30	-0.	47	21.39	-0.	72	33.01	-0.	97	44.64	-0.
22	9.76	-0.	48	21.85	-0.	73	33.48	-0.	98	45.10	-0.
23	10.23	-0.	49	22.32	-0.	74	33.94	-0.	99	45.57	-0.
24	10.69	-0.	50	22.78	-0.	75	34.41	-0.	100	46.03	-0.
25	11.16	-0.	51	23.25	-0.	76	34.87	-0.	101	46.50	-0.
26	11.62	-0.									

********** CHANNEL FLOWS (CFS) **********

CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE	CHAN NO	RIVER MILE	VALUE
1	.23	-1.024E+03	26	11.86	-8.291E+02	51	23.48	-6.025E+02	76	35.11	-5.883E+02
2	.70	-1.024E+03	27	12.32	-8.290E+02	52	23.95	-6.025E+02	77	35.57	-5.883E+02
3	1.16	-1.024E+03	28	12.79	-8.290E+02	53	24.41	-6.025E+02	78	36.04	-5.174E+02
4	1.63	-1.024E+03	29	13.25	-8.290E+02	54	24.88	-6.044E+02	79	36.50	-5.174E+02
5	2.09	-1.024E+03	30	13.72	-8.290E+02	55	25.34	-6.044E+02	80	36.97	-5.174E+02
6	2.56	-1.024E+03	31	14.18	-8.290E+02	56	25.81	-6.044E+02	81	37.43	-5.171E+02
7	3.02	-1.024E+03	32	14.65	-8.290E+02	57	26.27	-6.034E+02	82	37.90	-5.171E+02
8	3.49	-1.024E+03	33	15.11	-8.290E+02	58	26.74	-6.034E+02	83	38.36	-5.171E+02
9	3.95	-1.024E+03	34	15.58	-8.290E+02	59	27.20	-6.034E+02	84	38.83	-5.171E+02
10	4.42	-1.023E+03	35	16.04	-8.290E+02	60	27.67	-6.034E+02	85	39.29	-4.837E+02
11	4.88	-1.023E+03	36	16.51	-6.498E+02	61	28.13	-6.034E+02	86	39.76	-4.837E+02
12	5.35	-1.023E+03	37	16.97	-6.498E+02	62	28.60	-6.034E+02	87	40.22	-4.837E+02
13	5.81	-1.023E+03	38	17.44	-6.498E+02	63	29.06	-6.034E+02	88	40.69	-4.207E+02
14	6.28	-1.023E+03	39	17.90	-6.498E+02	64	29.53	-6.029E+02	89	41.15	-4.207E+02
15	6.74	-1.023E+03	40	18.37	-6.463E+02	65	29.99	-6.029E+02	90	41.62	-4.207E+02
16	7.21	-1.023E+03	41	18.83	-6.463E+02	66	30.46	-6.029E+02	91	42.08	-4.207E+02
17	7.67	-1.023E+03	42	19.30	-6.463E+02	67	30.92	-5.993E+02	92	42.55	-4.050E+02
18	8.14	-1.023E+03	43	19.76	-6.450E+02	68	31.39	-5.993E+02	93	43.01	-4.050E+02
19	8.60	-1.015E+03	44	20.23	-6.340E+02	69	31.85	-5.993E+02	94	43.48	-4.050E+02
20	9.07	-1.015E+03	45	20.69	-6.340E+02	70	32.32	-5.993E+02	95	43.94	-4.050E+02
21	9.53	-9.227E+02	46	21.16	-6.240E+02	71	32.78	-5.993E+02	96	44.41	-4.014E+02
22	10.00	-9.160E+02	47	21.62	-6.240E+02	72	33.25	-5.891E+02	97	44.87	-4.014E+02
23	10.46	-9.704E+02	48	22.09	-6.240E+02	73	33.71	-5.891E+02	98	45.34	-4.014E+02
24	10.93	-9.914E+02	49	22.55	-6.240E+02	74	34.18	-5.891E+02	99	45.80	-4.014E+02
25	11.39	-8.353E+02	50	23.02	-6.035E+02	75	34.64	-5.891E+02	100	46.27	-4.004E+02

********** STEADY STATE CROD INPUT CONDITIONS **********

********** POINT SOURCE INFLOW CONCENTRATIONS (PPM) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	2.200E+00	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	3.200E+00
3	.93	0.	29	13.02	0.	54	24.64	5.100E+00	79	36.27	0.
4	1.39	2.900E+00	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	4.100E+00
6	2.32	0.	32	14.41	0.	57	26.04	2.500E+00	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	1.200E+00	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	4.304E+00
10	4.18	1.450E+02	36	16.27	1.995E+01	61	27.90	0.	86	39.52	0.
11	4.65	7.700E+00	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	2.200E+00
13	5.58	0.	39	17.67	0.	64	29.29	4.900E+00	89	40.92	0.
14	6.04	0.	40	18.13	2.090E+01	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	1.700E+00	92	42.31	2.320E+01
17	7.44	0.	43	19.53	4.385E-01	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	9.881E+00	69	31.62	0.	94	43.24	2.320E+01
19	8.37	1.300E+00	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	2.500E+00	71	32.55	0.	96	44.17	1.288E+00
21	9.30	1.800E+01	47	21.39	0.	72	33.01	3.860E+00	97	44.64	0.
22	9.76	4.600E+00	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	5.173E+00	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	4.788E+00	50	22.78	4.168E+00	75	34.41	0.	100	46.03	4.060E+02
25	11.16	3.251E+00	51	23.25	1.700E+00	76	34.87	1.400E+00	101	46.50	1.409E+00
26	11.62	4.726E+00									

********** NONPOINT SOURCE LOADS (LBS/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

CONVERGENCE IN 101 CYCLES

LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)

STEADY STATE CBOD CONCENTRATIONS (PPM)

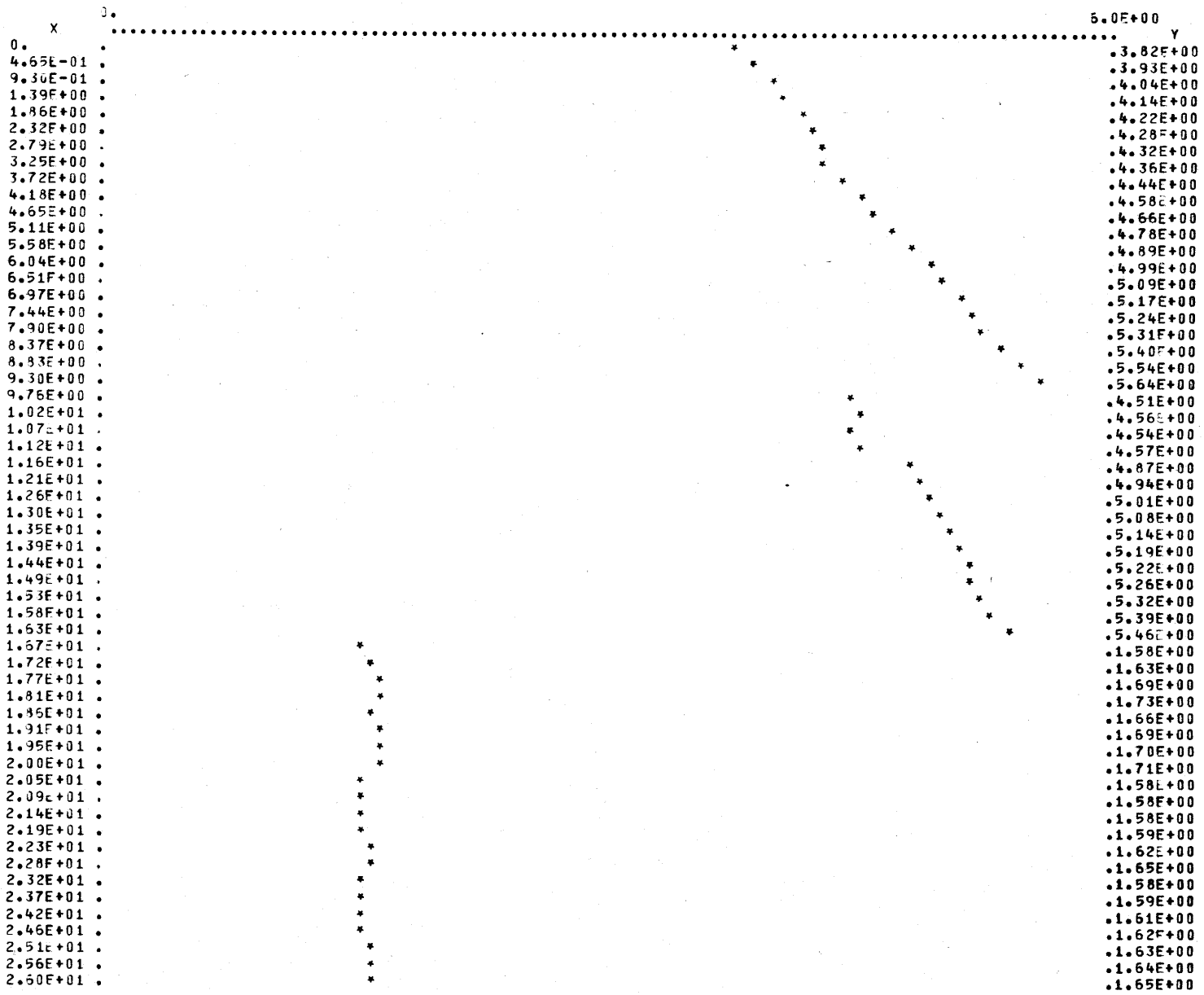
OUTFLOW AT DOWNSTREAM END = 1024.2 CFS

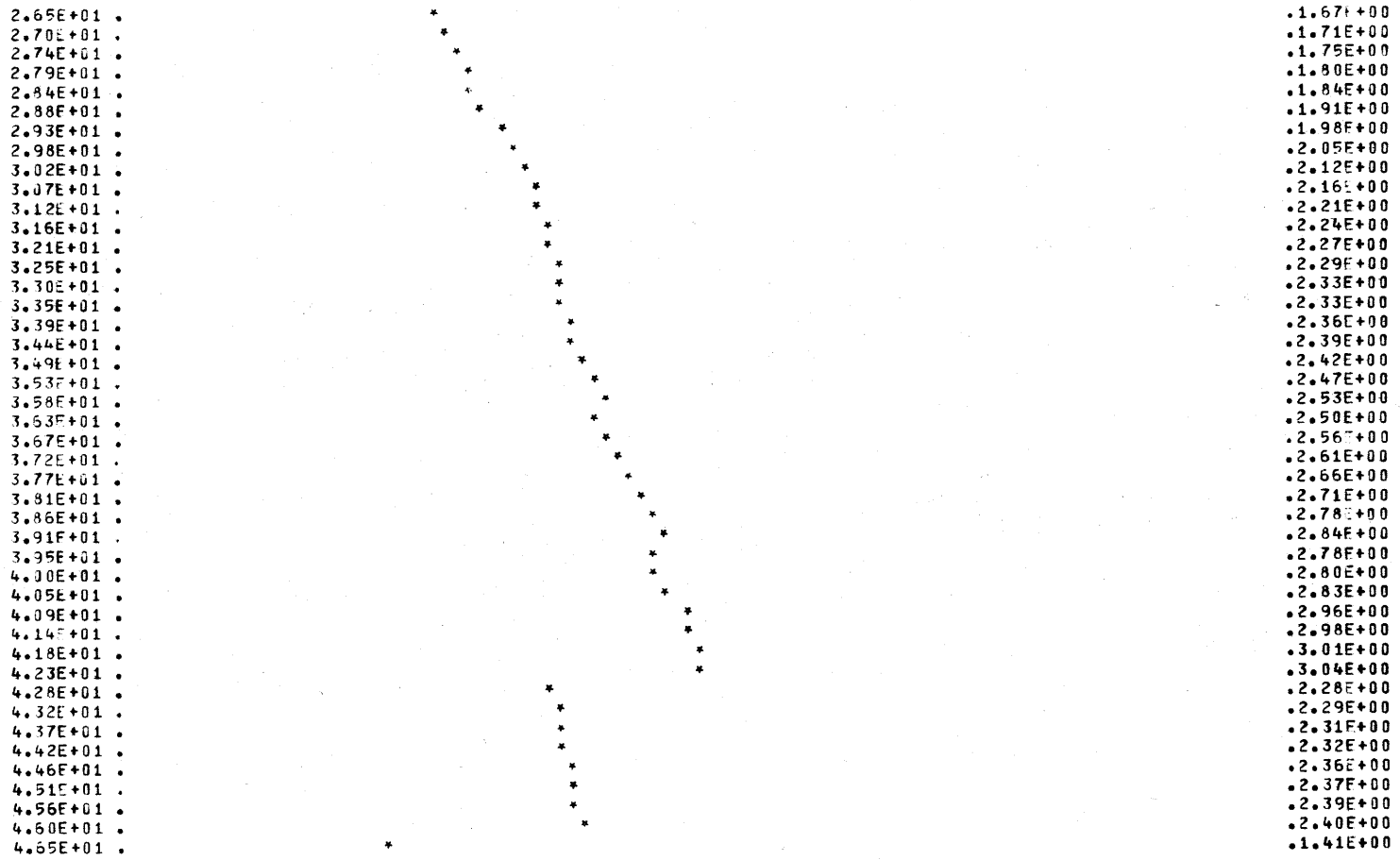
CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	3.823E+00	27	12.09	4.938E+00	52	23.71	1.593E+00	77	35.34	2.465E+00
2	.46	3.931E+00	28	12.55	5.010E+00	53	24.18	1.606E+00	78	35.80	2.525E+00
3	.93	4.038E+00	29	13.02	5.079E+00	54	24.64	1.620E+00	79	36.27	2.504E+00
4	1.39	4.137E+00	30	13.48	5.140E+00	55	25.11	1.628E+00	80	35.73	2.561E+00
5	1.86	4.220E+00	31	13.95	5.187E+00	56	25.57	1.637E+00	81	37.20	2.613E+00
6	2.32	4.280E+00	32	14.41	5.220E+00	57	26.04	1.649E+00	82	37.66	2.663E+00
7	2.79	4.321E+00	33	14.88	5.251E+00	58	26.50	1.671E+00	83	38.13	2.715E+00
8	3.25	4.357E+00	34	15.34	5.324E+00	59	26.97	1.708E+00	84	38.59	2.780E+00
9	3.72	4.444E+00	35	15.81	5.395E+00	60	27.43	1.755E+00	85	39.06	2.840E+00
10	4.18	4.581E+00	36	16.27	5.463E+00	61	27.90	1.801E+00	86	39.52	2.776E+00
11	4.65	4.660E+00	37	16.74	1.583E+00	62	28.36	1.845E+00	87	39.99	2.803E+00
12	5.11	4.779E+00	38	17.20	1.632E+00	63	28.83	1.906E+00	88	40.45	2.832E+00
13	5.58	4.888E+00	39	17.67	1.686E+00	64	29.29	1.983E+00	89	40.92	2.957E+00
14	6.04	4.992E+00	40	18.13	1.731E+00	65	29.76	2.054E+00	90	41.38	2.981E+00
15	6.51	5.047E+00	41	18.60	1.662E+00	66	30.22	2.116E+00	91	41.85	3.007E+00
16	6.97	5.168E+00	42	19.06	1.686E+00	67	30.69	2.165E+00	92	42.31	3.038E+00
17	7.44	5.237E+00	43	19.53	1.701E+00	68	31.15	2.210E+00	93	42.78	2.278E+00
18	7.90	5.313E+00	44	19.99	1.713E+00	69	31.62	2.242E+00	94	43.24	2.291E+00
19	8.37	5.401E+00	45	20.46	1.578E+00	70	32.08	2.266E+00	95	43.71	2.305E+00
20	8.83	5.536E+00	46	20.92	1.584E+00	71	32.55	2.293E+00	96	44.17	2.323E+00
21	9.30	5.642E+00	47	21.39	1.577E+00	72	33.01	2.326E+00	97	44.64	2.357E+00
22	9.76	4.515E+00	48	21.85	1.592E+00	73	33.48	2.333E+00	98	45.10	2.375E+00
23	10.23	4.561E+00	49	22.32	1.620E+00	74	33.94	2.363E+00	99	45.57	2.390E+00
24	10.69	4.539E+00	50	22.78	1.648E+00	75	34.41	2.389E+00	100	46.03	2.401E+00
25	11.16	4.569E+00	51	23.25	1.580E+00	76	34.87	2.419E+00	101	46.50	1.406E+00
26	11.62	4.871E+00									

X=RIVER MILE

Y= CBOD CONCENTRATIONS (PPM)

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********** STEADY STATE NBOD INPUT CONDITIONS **********

********** POINT SOURCE INFLOW CONCENTRATIONS (PPM) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	3.800E+00	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	5.500E+00
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	5.310E+00
4	1.39	5.000E+00	30	13.48	0.	55	25.11	0.	80	36.73	7.706E+00
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	1.200E+00
6	2.32	0.	32	14.41	0.	57	26.04	1.500E+00	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	1.300E+00	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	1.459E+00
10	4.18	5.800E+00	36	16.27	1.912E+01	61	27.90	0.	86	39.52	0.
11	4.65	4.200E+00	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	1.300E+00
13	5.58	0.	39	17.67	0.	64	29.29	6.000E-01	89	40.92	0.
14	6.04	0.	40	18.13	5.000E+00	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	2.100E+00	92	42.31	1.610E+01
17	7.44	0.	43	19.53	2.469E+00	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	3.000E+00	69	31.62	0.	94	43.24	1.690E+01
19	8.37	3.700E+00	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	4.000E+00	71	32.55	0.	96	44.17	1.481E+00
21	9.30	6.910E+01	47	21.39	0.	72	33.01	6.382E+00	97	44.64	0.
22	9.76	3.600E+00	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	6.185E+00	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	5.992E+00	50	22.78	3.966E+00	75	34.41	0.	100	46.03	9.610E+01
25	11.16	1.781E+01	51	23.25	1.600E+00	76	34.87	2.600E+00	101	46.50	1.940E+00
26	11.62	4.782E+00									

********** NONPOINT SOURCE LOADS (LBS/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

CONVERGENCE IN 101 CYCLES

LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)

STEADY STATE NBOD CONCENTRATIONS (PPM)

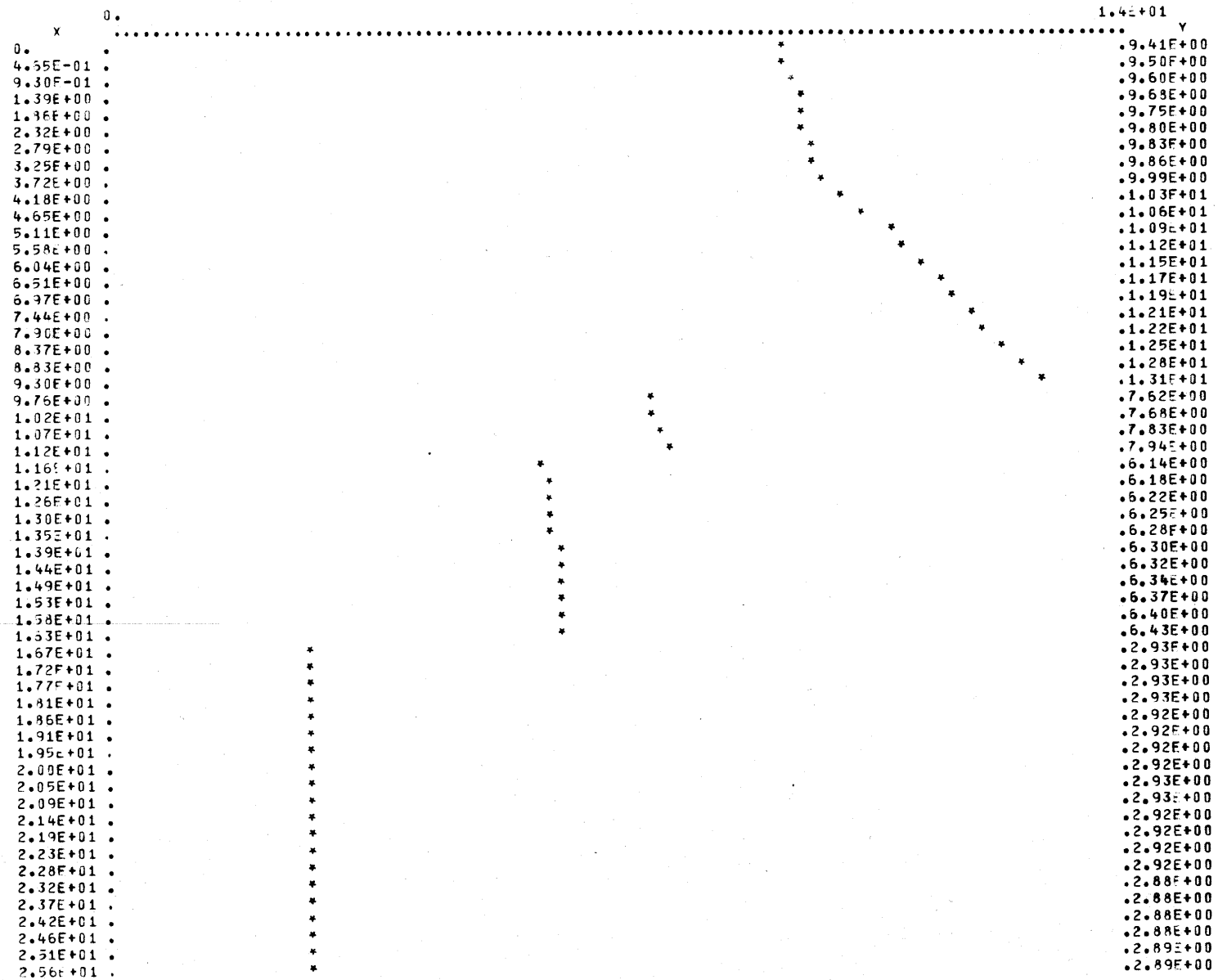
OUTFLOW AT DOWNSTREAM END = 1024.2 CFS

CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	9.410E+00	27	12.09	6.181E+00	52	23.71	2.883E+00	77	35.34	2.835E+00
2	.46	9.504E+00	28	12.55	6.216E+00	53	24.18	2.883E+00	78	35.80	2.835E+00
3	.93	9.596E+00	29	13.02	6.250E+00	54	24.64	2.883E+00	79	35.27	2.469E+00
4	1.39	9.679E+00	30	13.48	6.279E+00	55	25.11	2.886E+00	80	36.73	2.453E+00
5	1.86	9.750E+00	31	13.95	6.301E+00	56	25.57	2.886E+00	81	37.20	2.431E+00
6	2.32	9.799E+00	32	14.41	6.317E+00	57	26.04	2.886E+00	82	37.66	2.432E+00
7	2.79	9.833E+00	33	14.88	6.336E+00	58	26.50	2.888E+00	83	38.13	2.432E+00
8	3.25	9.862E+00	34	15.34	6.366E+00	59	26.97	2.888E+00	84	38.59	2.432E+00
9	3.72	9.986E+00	35	15.81	6.398E+00	60	27.43	2.888E+00	85	39.06	2.432E+00
10	4.18	1.032E+01	36	16.27	6.430E+00	61	27.90	2.888E+00	86	39.52	2.499E+00
11	4.65	1.064E+01	37	16.74	2.931E+00	62	28.36	2.888E+00	87	39.99	2.499E+00
12	5.11	1.093E+01	38	17.20	2.931E+00	63	28.83	2.888E+00	88	40.45	2.499E+00
13	5.58	1.120E+01	39	17.67	2.931E+00	64	29.29	2.888E+00	89	40.92	2.678E+00
14	6.04	1.145E+01	40	18.13	2.931E+00	65	29.76	2.890E+00	90	41.38	2.678E+00
15	6.51	1.169E+01	41	18.60	2.920E+00	66	30.22	2.890E+00	91	41.85	2.678E+00
16	6.97	1.188E+01	42	19.06	2.920E+00	67	30.69	2.890E+00	92	42.31	2.678E+00
17	7.44	1.206E+01	43	19.53	2.920E+00	68	31.15	2.895E+00	93	42.78	2.158E+00
18	7.90	1.224E+01	44	19.99	2.921E+00	69	31.62	2.895E+00	94	43.24	2.158E+00
19	8.37	1.246E+01	45	20.46	2.934E+00	70	32.08	2.895E+00	95	43.71	2.157E+00
20	8.83	1.279E+01	46	20.92	2.934E+00	71	32.55	2.895E+00	96	44.17	2.157E+00
21	9.30	1.305E+01	47	21.39	2.917E+00	72	33.01	2.895E+00	97	44.64	2.173E+00
22	9.76	7.623E+00	48	21.85	2.917E+00	73	33.48	2.834E+00	98	45.10	2.173E+00
23	10.23	7.681E+00	49	22.32	2.917E+00	74	33.94	2.834E+00	99	45.57	2.173E+00
24	10.69	7.828E+00	50	22.78	2.917E+00	75	34.41	2.834E+00	100	46.03	2.173E+00
25	11.16	7.943E+00	51	23.25	2.881E+00	76	34.87	2.834E+00	101	46.50	1.938E+00
26	11.62	6.138E+00									

X=RIVER MILE

Y= NBOD CONCENTRATIONS (PPM)

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STEADY STATE DO INPUT CONDITIONS

POINT SOURCE INFLOW CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	7.200E+00	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	9.900E+00
3	.93	0.	29	13.02	0.	54	24.64	1.310E+01	79	36.27	0.
4	1.39	1.090E+01	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	7.900E+00
6	2.32	0.	32	14.41	0.	57	26.04	1.000E+01	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	1.050E+01	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	3.289E+00
10	4.18	1.000E+00	36	16.27	8.372E+00	61	27.90	0.	86	39.52	0.
11	4.65	8.600E+00	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	9.600E+00
13	5.58	0.	39	17.67	0.	64	29.29	9.100E+00	89	40.92	0.
14	6.04	0.	40	18.13	8.400E+00	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	7.300E+00	92	42.31	8.300E+00
17	7.44	0.	43	19.53	9.692E+00	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	8.366E+00	69	31.62	0.	94	43.24	3.900E+00
19	8.37	8.700E+00	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	9.100E+00	71	32.55	0.	96	44.17	9.005E+00
21	9.30	7.100E+00	47	21.39	0.	72	33.01	7.221E+00	97	44.64	0.
22	9.76	7.100E+00	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	5.691E+00	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	6.983E+00	50	22.78	9.400E+00	75	34.41	0.	100	46.03	4.000E-01
25	11.16	8.080E+00	51	23.25	8.000E+00	76	34.87	7.100E+00	101	46.50	9.300E+00
26	11.62	7.079E+00									

NONPOINT SOURCE LOADS (LBS/DAY)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

CONVERGENCE IN 45 CYCLES

LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)

STEADY STATE DO CONCENTRATIONS (PPM)

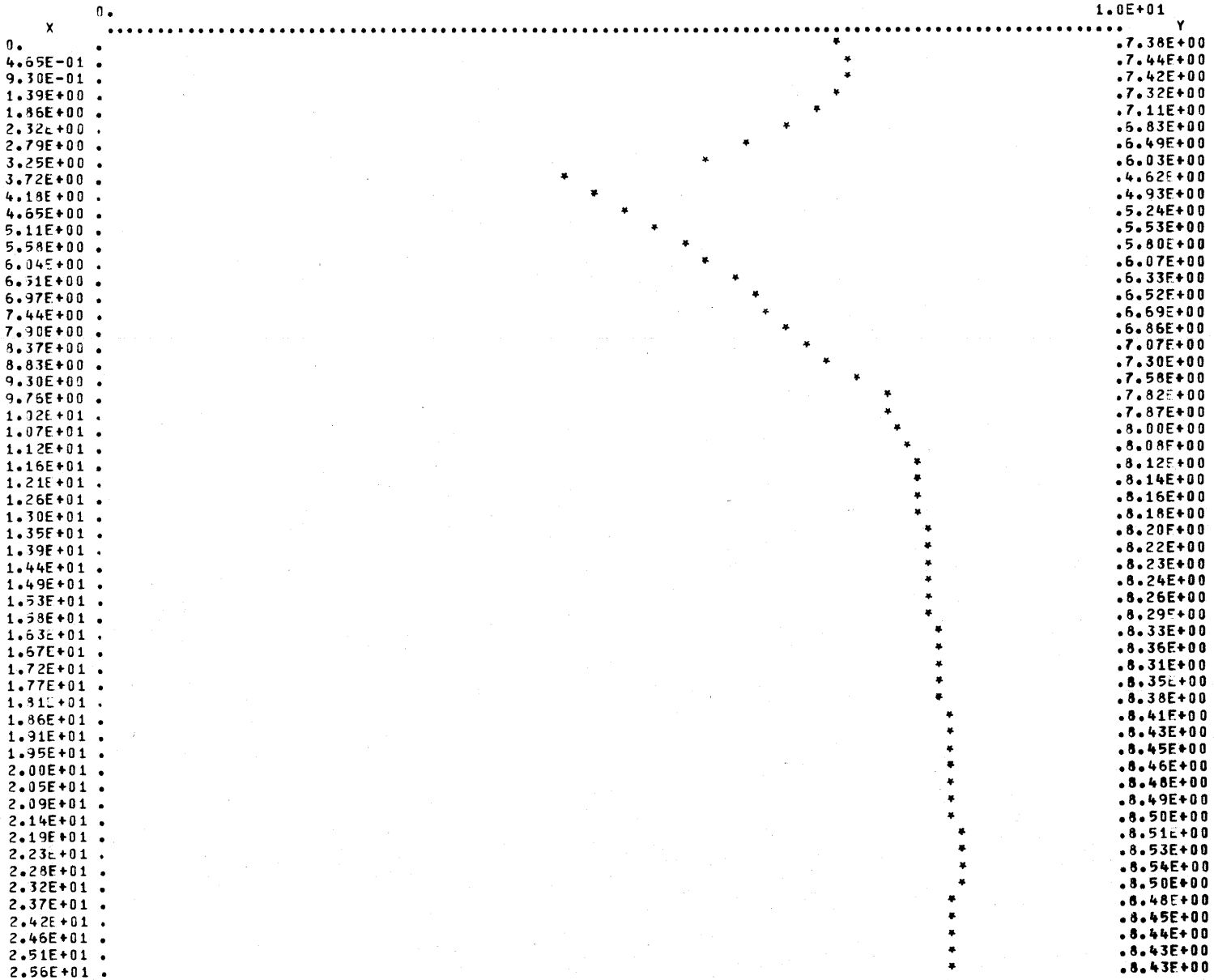
OUTFLOW AT DOWNSTREAM END = 1024.2 CFS

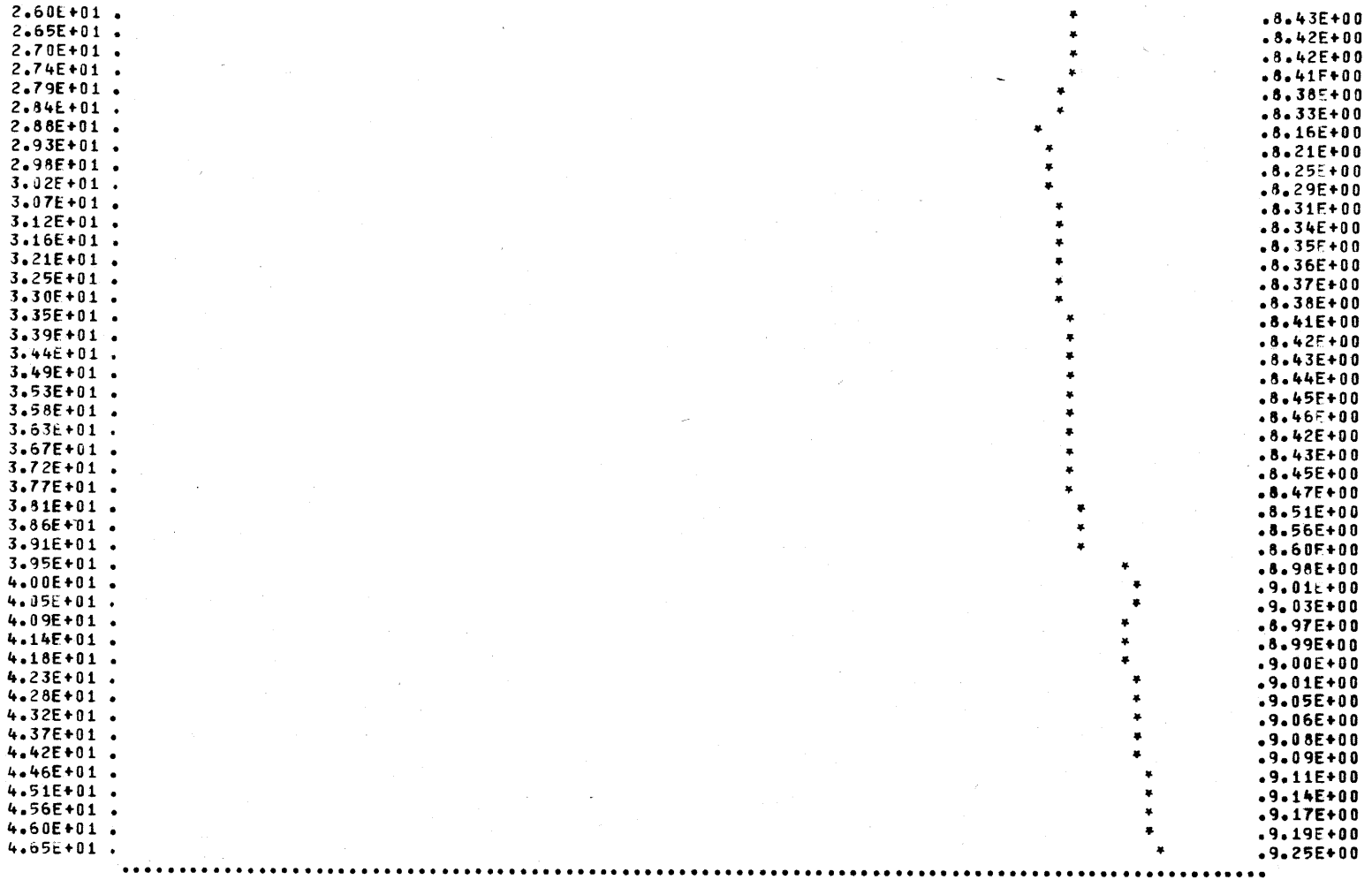
CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	7.380E+00	27	12.09	8.137E+00	52	23.71	8.477E+00	77	35.34	8.446E+00
2	.46	7.439E+00	28	12.55	8.161E+00	53	24.18	8.452E+00	78	35.80	8.457E+00
3	.93	7.420E+00	29	13.02	8.183E+00	54	24.64	8.444E+00	79	36.27	8.418E+00
4	1.39	7.316E+00	30	13.48	8.202E+00	55	25.11	8.433E+00	80	36.73	8.429E+00
5	1.86	7.113E+00	31	13.95	8.218E+00	56	25.57	8.429E+00	81	37.20	8.447E+00
6	2.32	6.828E+00	32	14.41	8.228E+00	57	26.04	8.426E+00	82	37.66	8.473E+00
7	2.79	6.493E+00	33	14.88	8.242E+00	58	26.50	8.423E+00	83	38.13	8.506E+00
8	3.25	6.034E+00	34	15.34	8.263E+00	59	26.97	8.419E+00	84	38.59	8.560E+00
9	3.72	4.619E+00	35	15.81	8.292E+00	60	27.43	8.407E+00	85	39.06	8.598E+00
10	4.18	4.926E+00	36	16.27	8.331E+00	61	27.90	8.381E+00	86	39.52	8.978E+00
11	4.65	5.237E+00	37	16.74	8.356E+00	62	28.36	8.326E+00	87	39.99	9.006E+00
12	5.11	5.526E+00	38	17.20	8.314E+00	63	28.83	8.162E+00	88	40.45	9.034E+00
13	5.58	5.802E+00	39	17.67	8.355E+00	64	29.29	8.213E+00	89	40.92	8.974E+00
14	6.04	6.073E+00	40	18.13	8.385E+00	65	29.76	8.254E+00	90	41.38	8.985E+00
15	6.51	6.326E+00	41	18.60	8.410E+00	66	30.22	8.288E+00	91	41.85	8.998E+00
16	6.97	6.520E+00	42	19.06	8.432E+00	67	30.69	8.312E+00	92	42.31	9.014E+00
17	7.44	6.685E+00	43	19.53	8.449E+00	68	31.15	8.338E+00	93	42.78	9.053E+00
18	7.90	6.861E+00	44	19.99	8.461E+00	69	31.62	8.352E+00	94	43.24	9.063E+00
19	8.37	7.069E+00	45	20.46	8.476E+00	70	32.08	8.362E+00	95	43.71	9.076E+00
20	8.83	7.298E+00	46	20.92	8.491E+00	71	32.55	8.372E+00	96	44.17	9.093E+00
21	9.30	7.576E+00	47	21.39	8.496E+00	72	33.01	8.382E+00	97	44.64	9.113E+00
22	9.76	7.817E+00	48	21.85	8.512E+00	73	33.48	8.413E+00	98	45.10	9.138E+00
23	10.23	7.871E+00	49	22.32	8.530E+00	74	33.94	8.423E+00	99	45.57	9.165E+00
24	10.69	7.999E+00	50	22.78	8.537E+00	75	34.41	8.431E+00	100	46.03	9.189E+00
25	11.16	8.082E+00	51	23.25	8.502E+00	76	34.87	8.437E+00	101	46.50	9.246E+00
26	11.62	8.116E+00									

X=RIVER MILE

Y= DO CONCENTRATIONS (PPM)

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********** STEADY STATE COLI INPUT CONDITIONS **********

********** POINT SOURCE INFLOW CONCENTRATIONS (PPM) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	4.200E+02
3	.93	0.	29	13.02	0.	54	24.64	1.000E+03	79	36.27	0.
4	1.39	2.400E+03	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	4.300E+03	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	8.000E+03	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	5.283E+03
10	4.18	2.500E+05	36	16.27	6.501E+03	61	27.90	0.	86	39.52	0.
11	4.65	4.100E+03	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	4.000E+02	63	28.83	0.	88	40.45	6.200E+03
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	1.100E+03	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	7.100E+03	92	42.31	9.000E+03
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	2.501E+04	69	31.62	0.	94	43.24	1.470E+05
19	8.37	4.550E+03	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	6.100E+03	71	32.55	0.	96	44.17	4.859E+03
21	9.30	5.000E+03	47	21.39	0.	72	33.01	8.401E+03	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	1.263E+03	75	34.41	0.	100	46.03	4.500E+05
25	11.16	2.500E+03	51	23.25	4.000E+03	76	34.87	3.100E+03	101	46.50	6.400E+02
25	11.62	9.644E+03									

********** NONPOINT SOURCE LOADS (LBS/DAY) **********

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

CONVERGENCE IN 101 CYCLES

LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)

STEADY STATE COLI CONCENTRATIONS(NO/100ML)

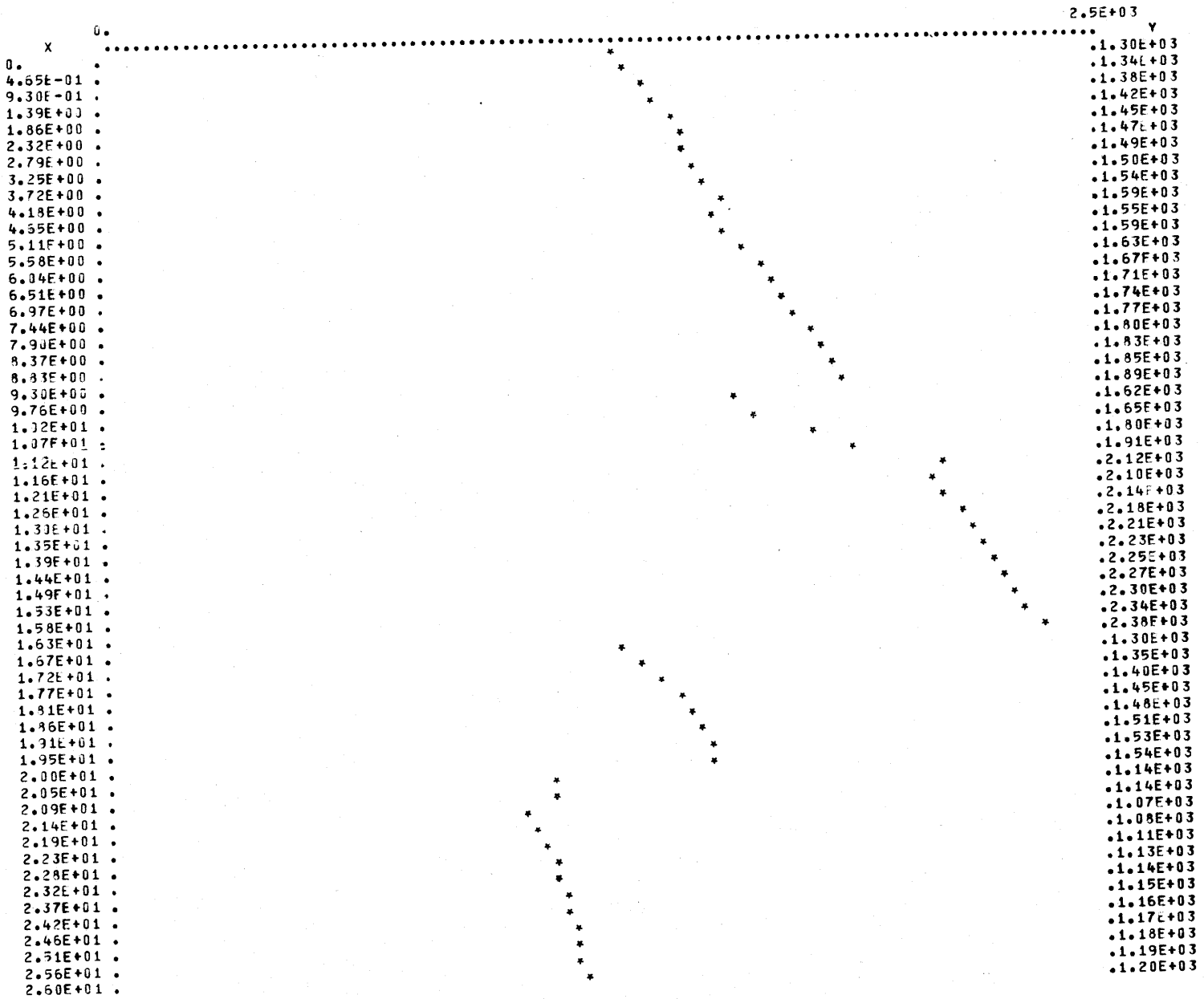
OUTFLOW AT DOWNSTREAM END = 1024.2 CFS

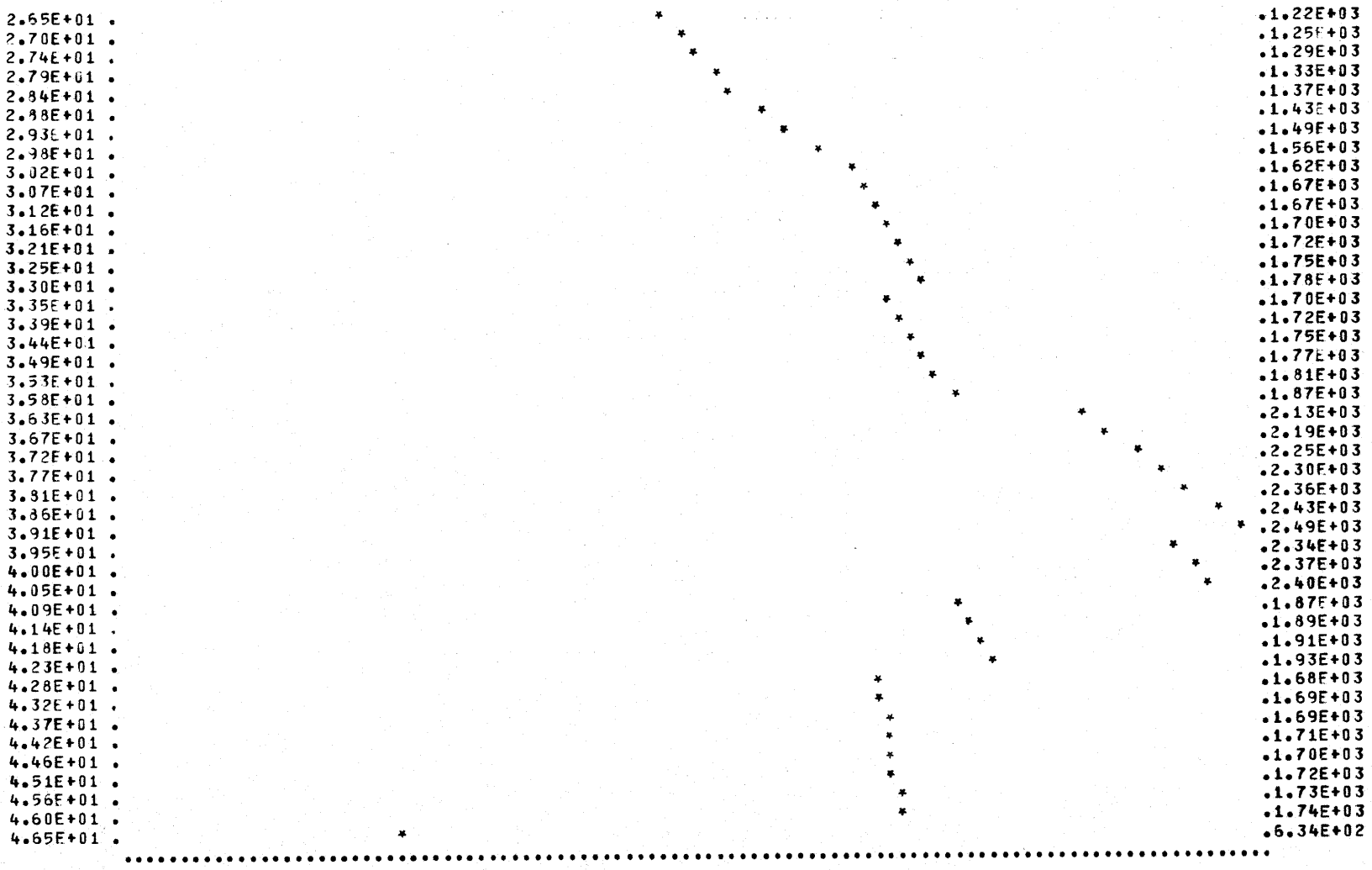
CONCENTRATIONS (NO/100ML)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	1.297E+03	27	12.09	2.103E+03	52	23.71	1.147E+03	77	35.34	1.813E+03
2	.46	1.339E+03	28	12.55	2.140E+03	53	24.18	1.159E+03	78	35.80	1.868E+03
3	.93	1.380E+03	29	13.02	2.176E+03	54	24.64	1.171E+03	79	36.27	2.131E+03
4	1.39	1.419E+03	30	13.48	2.208E+03	55	25.11	1.182E+03	80	36.73	2.191E+03
5	1.86	1.451E+03	31	13.95	2.232E+03	56	25.57	1.189E+03	81	37.20	2.245E+03
6	2.32	1.474E+03	32	14.41	2.249E+03	57	26.04	1.200E+03	82	37.66	2.300E+03
7	2.79	1.490E+03	33	14.88	2.271E+03	58	26.50	1.215E+03	83	38.13	2.355E+03
8	3.25	1.504E+03	34	15.34	2.303E+03	59	26.97	1.248E+03	84	38.59	2.426E+03
9	3.72	1.538E+03	35	15.81	2.340E+03	60	27.43	1.290E+03	85	39.06	2.492E+03
10	4.18	1.592E+03	36	16.27	2.376E+03	61	27.90	1.330E+03	86	39.52	2.342E+03
11	4.65	1.548E+03	37	16.74	1.299E+03	62	28.36	1.370E+03	87	39.99	2.371E+03
12	5.11	1.593E+03	38	17.20	1.347E+03	63	28.83	1.425E+03	88	40.45	2.402E+03
13	5.58	1.634E+03	39	17.67	1.401E+03	64	29.29	1.495E+03	89	40.92	1.868E+03
14	6.04	1.674E+03	40	18.13	1.446E+03	65	29.76	1.563E+03	90	41.38	1.887E+03
15	6.51	1.710E+03	41	18.60	1.484E+03	66	30.22	1.620E+03	91	41.85	1.909E+03
16	6.97	1.741E+03	42	19.06	1.509E+03	67	30.69	1.666E+03	92	42.31	1.934E+03
17	7.44	1.768E+03	43	19.53	1.525E+03	68	31.15	1.672E+03	93	42.78	1.678E+03
18	7.90	1.797E+03	44	19.99	1.539E+03	69	31.62	1.702E+03	94	43.24	1.690E+03
19	8.37	1.832E+03	45	20.46	1.140E+03	70	32.08	1.725E+03	95	43.71	1.695E+03
20	8.83	1.847E+03	46	20.92	1.144E+03	71	32.55	1.750E+03	96	44.17	1.712E+03
21	9.30	1.888E+03	47	21.39	1.071E+03	72	33.01	1.780E+03	97	44.64	1.700E+03
22	9.76	1.618E+03	48	21.85	1.084E+03	73	33.48	1.697E+03	98	45.10	1.717E+03
23	10.23	1.649E+03	49	22.32	1.107E+03	74	33.94	1.724E+03	99	45.57	1.731E+03
24	10.69	1.803E+03	50	22.78	1.131E+03	75	34.41	1.747E+03	100	46.03	1.741E+03
25	11.16	1.909E+03	51	23.25	1.141E+03	76	34.87	1.774E+03	101	46.50	6.342E+02
26	11.62	2.123E+03									

Y= COLI CONCENTRATIONS (NO/100ML)

X=RIVER MILE

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.1.74E+03
.6.34E+02

STEADY STATE 1HAR INPUT CONDITIONS

POINT SOURCE INFLOW CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	8.800E+00	27	12.09	1.320E+02	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	7.900E+01
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	6.200E+01
4	1.39	2.620E+02	30	13.48	0.	55	25.11	0.	80	36.73	5.735E+01
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	2.300E+01
6	2.32	0.	32	14.41	0.	57	26.04	9.800E+01	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	1.460E+02	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	4.260E+01
10	4.18	1.090E+02	36	16.27	1.852E+02	61	27.90	0.	86	39.52	0.
11	4.65	1.400E+02	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	1.960E+02	63	28.83	0.	88	40.45	2.200E+01
13	5.58	0.	39	17.67	0.	64	29.29	8.800E+01	89	40.92	0.
14	6.04	0.	40	18.13	2.210E+02	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	6.300E+01	92	42.31	3.300E+01
17	7.44	0.	43	19.53	1.620E+02	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	2.290E+02	69	31.62	0.	94	43.24	4.400E+01
19	8.37	2.560E+02	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	2.520E+02	71	32.55	0.	96	44.17	1.729E+01
21	9.30	1.750E+02	47	21.39	0.	72	33.01	6.411E+01	97	44.64	0.
22	9.76	1.100E+02	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	1.038E+02	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	1.071E+02	50	22.78	1.342E+02	75	34.41	0.	100	46.03	2.100E+01
25	11.16	1.606E+02	51	23.25	5.500E+01	76	34.87	5.800E+01	101	46.50	3.500E+01
26	11.62	6.006E+01									

NONPOINT SOURCE LOADS (LBS/DAY)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	0.	27	12.09	0.	52	23.71	0.	77	35.34	0.
2	.46	0.	28	12.55	0.	53	24.18	0.	78	35.80	0.
3	.93	0.	29	13.02	0.	54	24.64	0.	79	36.27	0.
4	1.39	0.	30	13.48	0.	55	25.11	0.	80	36.73	0.
5	1.86	0.	31	13.95	0.	56	25.57	0.	81	37.20	0.
6	2.32	0.	32	14.41	0.	57	26.04	0.	82	37.66	0.
7	2.79	0.	33	14.88	0.	58	26.50	0.	83	38.13	0.
8	3.25	0.	34	15.34	0.	59	26.97	0.	84	38.59	0.
9	3.72	0.	35	15.81	0.	60	27.43	0.	85	39.06	0.
10	4.18	0.	36	16.27	0.	61	27.90	0.	86	39.52	0.
11	4.65	0.	37	16.74	0.	62	28.36	0.	87	39.99	0.
12	5.11	0.	38	17.20	0.	63	28.83	0.	88	40.45	0.
13	5.58	0.	39	17.67	0.	64	29.29	0.	89	40.92	0.
14	6.04	0.	40	18.13	0.	65	29.76	0.	90	41.38	0.
15	6.51	0.	41	18.60	0.	66	30.22	0.	91	41.85	0.
16	6.97	0.	42	19.06	0.	67	30.69	0.	92	42.31	0.
17	7.44	0.	43	19.53	0.	68	31.15	0.	93	42.78	0.
18	7.90	0.	44	19.99	0.	69	31.62	0.	94	43.24	0.
19	8.37	0.	45	20.46	0.	70	32.08	0.	95	43.71	0.
20	8.83	0.	46	20.92	0.	71	32.55	0.	96	44.17	0.
21	9.30	0.	47	21.39	0.	72	33.01	0.	97	44.64	0.
22	9.76	0.	48	21.85	0.	73	33.48	0.	98	45.10	0.
23	10.23	0.	49	22.32	0.	74	33.94	0.	99	45.57	0.
24	10.69	0.	50	22.78	0.	75	34.41	0.	100	46.03	0.
25	11.16	0.	51	23.25	0.	76	34.87	0.	101	46.50	0.
26	11.62	0.									

CONVERGENCE IN 101 CYCLES

LEHIGH RIVER - AVG LERMP DATA RUN (SUMMER 1974)

STEADY STATE 1HAR CONCENTRATIONS (PPM)

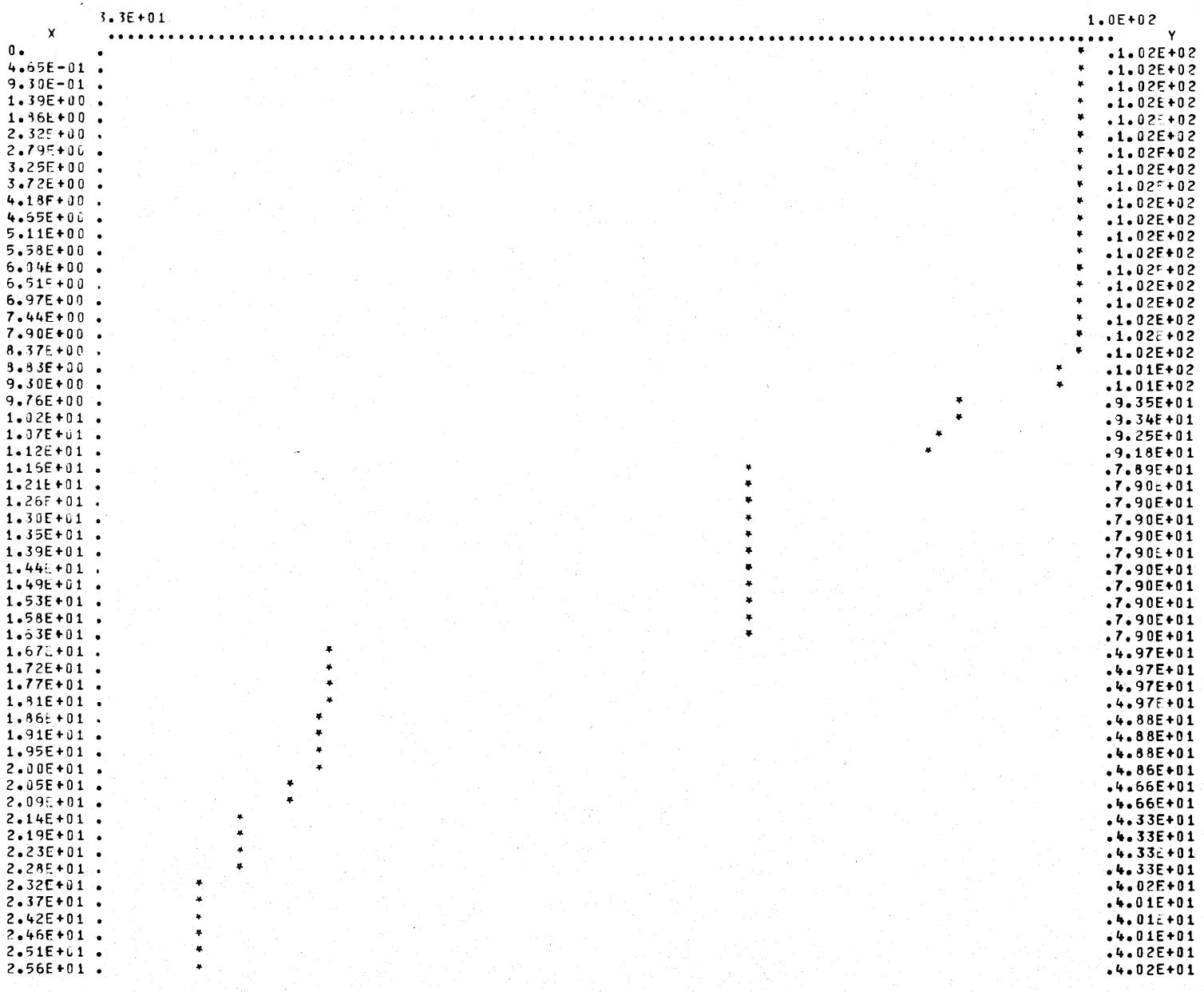
OUTFLOW AT DOWNSTREAM END = 1024.2 CFS

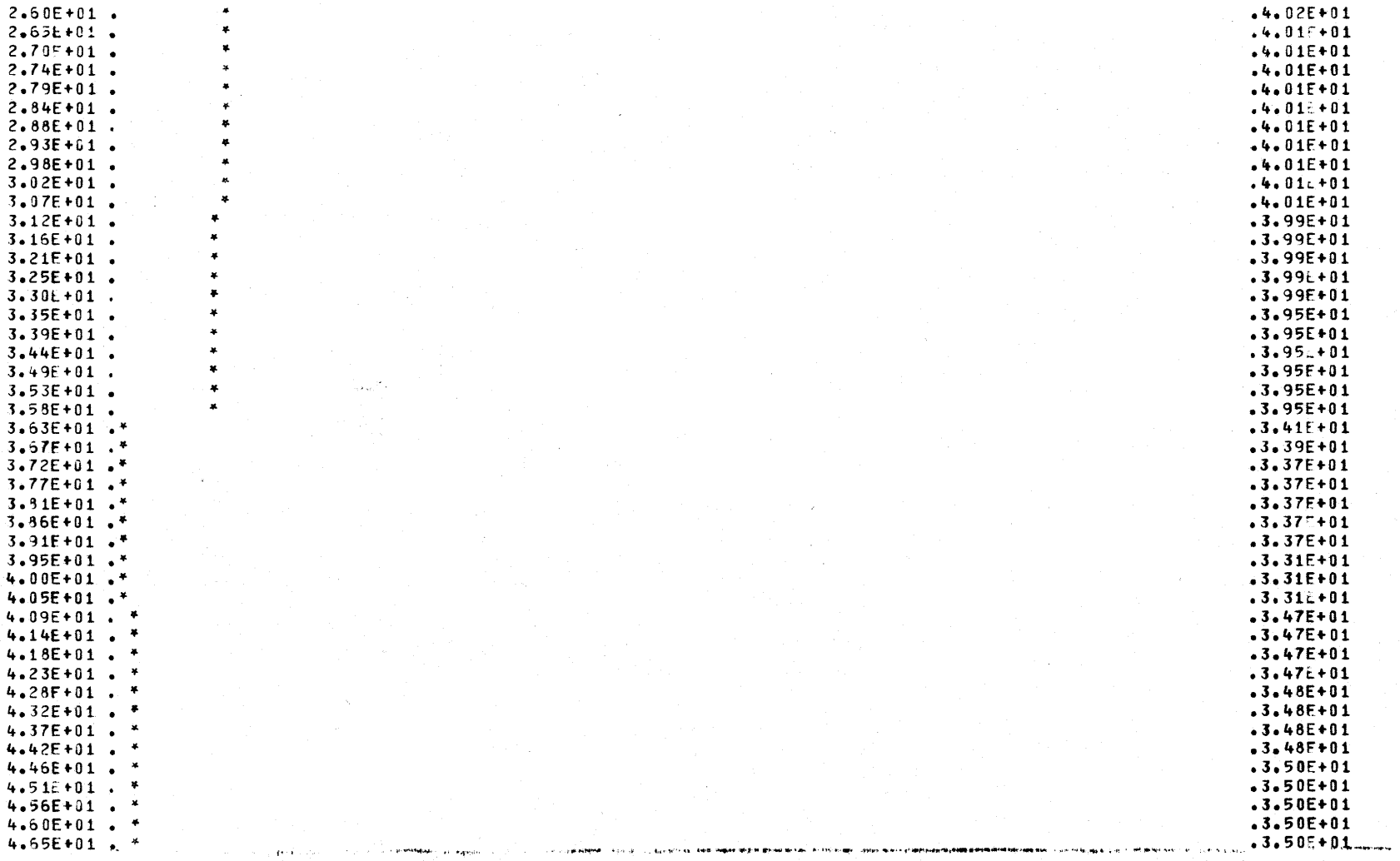
CONCENTRATIONS (PPM)

JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE	JUNC NO	RIVER MILE	VALUE
1	0.00	1.023E+02	27	12.09	7.903E+01	52	23.71	4.015E+01	77	35.34	3.948E+01
2	.46	1.023E+02	28	12.55	7.902E+01	53	24.18	4.015E+01	78	35.80	3.948E+01
3	.93	1.023E+02	29	13.02	7.902E+01	54	24.64	4.015E+01	79	36.27	3.406E+01
4	1.39	1.023E+02	30	13.48	7.902E+01	55	25.11	4.018E+01	80	36.73	3.387E+01
5	1.86	1.022E+02	31	13.95	7.902E+01	56	25.57	4.018E+01	81	37.20	3.371E+01
6	2.32	1.022E+02	32	14.41	7.902E+01	57	26.04	4.018E+01	82	37.66	3.370E+01
7	2.79	1.022E+02	33	14.88	7.902E+01	58	26.50	4.010E+01	83	38.13	3.370E+01
8	3.25	1.022E+02	34	15.34	7.902E+01	59	26.97	4.010E+01	84	38.59	3.370E+01
9	3.72	1.022E+02	35	15.81	7.902E+01	60	27.43	4.010E+01	85	39.06	3.370E+01
10	4.18	1.022E+02	36	16.27	7.902E+01	61	27.90	4.010E+01	86	39.52	3.308E+01
11	4.65	1.022E+02	37	16.74	4.975E+01	62	28.36	4.010E+01	87	39.99	3.308E+01
12	5.11	1.022E+02	38	17.20	4.975E+01	63	28.83	4.010E+01	88	40.45	3.308E+01
13	5.58	1.022E+02	39	17.67	4.975E+01	64	29.29	4.010E+01	89	40.92	3.474E+01
14	6.04	1.022E+02	40	18.13	4.975E+01	65	29.76	4.006E+01	90	41.38	3.474E+01
15	6.51	1.022E+02	41	18.60	4.881E+01	66	30.22	4.006E+01	91	41.85	3.474E+01
16	6.97	1.022E+02	42	19.06	4.881E+01	67	30.69	4.006E+01	92	42.31	3.474E+01
17	7.44	1.022E+02	43	19.53	4.881E+01	68	31.15	3.992E+01	93	42.78	3.481E+01
18	7.90	1.022E+02	44	19.99	4.858E+01	69	31.62	3.992E+01	94	43.24	3.481E+01
19	8.37	1.022E+02	45	20.46	4.658E+01	70	32.08	3.992E+01	95	43.71	3.481E+01
20	8.83	1.009E+02	46	20.92	4.658E+01	71	32.55	3.992E+01	96	44.17	3.481E+01
21	9.30	1.009E+02	47	21.39	4.326E+01	72	33.01	3.992E+01	97	44.64	3.496E+01
22	9.76	9.350E+01	48	21.85	4.326E+01	73	33.48	3.950E+01	98	45.10	3.496E+01
23	10.23	9.338E+01	49	22.32	4.326E+01	74	33.94	3.950E+01	99	45.57	3.496E+01
24	10.69	9.249E+01	50	22.78	4.326E+01	75	34.41	3.950E+01	100	46.03	3.496E+01
25	11.16	9.178E+01	51	23.25	4.017E+01	76	34.87	3.950E+01	101	46.50	3.500E+01
26	11.62	7.889E+01									

X=RIVER MILE

Y= THAB CONCENTRATIONS (PPM)




2.60E+01 . * .4.02E+01
2.65E+01 . * .4.01E+01
2.70E+01 . * .4.01E+01
2.74E+01 . * .4.01E+01
2.79E+01 . * .4.01E+01
2.84E+01 . * .4.01E+01
2.88E+01 . * .4.01E+01
2.93E+01 . * .4.01E+01
2.98E+01 . * .4.01E+01
3.02E+01 . * .4.01E+01
3.07E+01 . * .4.01E+01
3.12E+01 . * .3.99E+01
3.16E+01 . * .3.99E+01
3.21E+01 . * .3.99E+01
3.25E+01 . * .3.99E+01
3.30E+01 . * .3.99E+01
3.35E+01 . * .3.95E+01
3.39E+01 . * .3.95E+01
3.44E+01 . * .3.95E+01
3.49E+01 . * .3.95E+01
3.53E+01 . * .3.95E+01
3.58E+01 . * .3.95E+01
3.63E+01 .* .3.41E+01
3.67E+01 .* .3.39E+01
3.72E+01 .* .3.37E+01
3.77E+01 .* .3.37E+01
3.81E+01 .* .3.37E+01
3.86E+01 .* .3.37E+01
3.91E+01 .* .3.37E+01
3.95E+01 .* .3.31E+01
4.00E+01 .* .3.31E+01
4.05E+01 .* .3.31E+01
4.09E+01 . * .3.47E+01
4.14E+01 . * .3.47E+01
4.18E+01 . * .3.47E+01
4.23E+01 . * .3.47E+01
4.28E+01 . * .3.48E+01
4.32E+01 . * .3.48E+01
4.37E+01 . * .3.48E+01
4.42E+01 . * .3.48E+01
4.46E+01 . * .3.50E+01
4.51E+01 . * .3.50E+01
4.56E+01 . * .3.50E+01
4.60E+01 . * .3.50E+01
4.65E+01 . * .3.50E+01